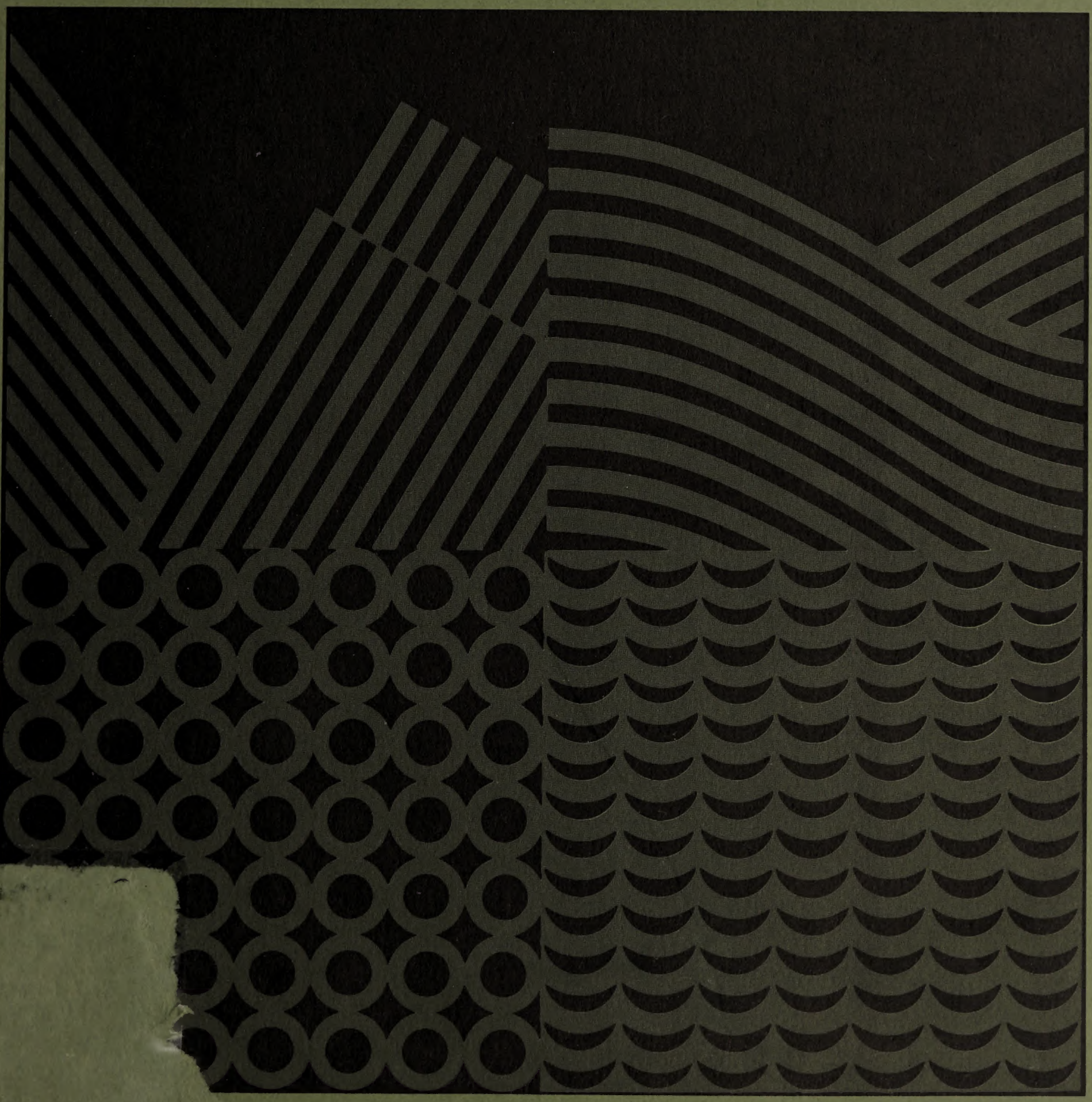
Proposed John Henry No. 1 Mine, King County, Washington

Draft
Environmental Impact
Statement OSM-EIS-13

BLM LIBRARY
88013612

U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement



#10719942
8013612

U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

TD
195
.C58
J63
1984

Proposed John Henry No. 1 Mine, King County, Washington

Draft Environmental Impact Statement
OSM-EIS-13

March 1984

Type of Action: Administrative

Prepared by the

U.S. Office of Surface Mining Reclamation and Enforcement

Acting Director

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

COVER SHEET

Proposed action: Approval of the permit application submitted by Pacific Coast Coal Company for the John Henry No. 1 mine and issuance of a Federal permit.

Type of statement: Draft environmental impact statement (EIS)

Agency: Office of Surface Mining Reclamation and Enforcement (OSM)

For further information:

Allen D. Klein
Attn: Charles Albrecht
Office of Surface Mining Reclamation and Enforcement
Brooks Towers
1020 - 15th Street
Denver, Colorado 80202

(303) 837-5421 (commercial)
327-5421 (FTS)

Abstract: Pacific Coast Coal Company proposes to mine a maximum of 385,000 tons per year of run-of-mine coal at peak production levels or 5.32 million tons over 16.2 years at its John Henry No. 1 mine. A coal processing facility capable of producing 250,000 tons of clean coal per year is also proposed. Approximately 363 acres would be disturbed during the life of the mine. Reclamation (spoil backfilling and contouring, topsoil replacement, and vegetation planting) would be completed within 19 years of commencement of the mining operation. The applicant has proposed a 32.5-acre, 250-foot-deep lake; OSM has made no final decision on whether the new lake, in the current location of Mud Lake, would meet regulations pertaining to restoration of approximate original contour and postmining land use objectives. There is one other small surface coal mine operating in the immediate vicinity of the proposed John Henry No. 1 mine; no plans for other coal mine development in the area are known, although additional coal reserves exist in the area. The John Henry No. 1 mine would have moderately significant social and economic impacts upon the community of Black Diamond, Washington, and the residents of unincorporated King County adjacent to the mine. In addition, impacts to topography, surface and ground water, soils, vegetation, and wildlife resources would be moderately significant. Impacts on other resources would not be significant, in that the capacity of those resources to meet anticipated uses would largely be maintained during mining or would be restored by reclamation.

Comments regarding this draft EIS must be received by: Please see insert sheet.

Please retain your copy of this draft EIS. Unless public comment is so extensive as to require that the draft EIS be commensurately revised, the **final EIS document** is anticipated to consist of public comments on the draft EIS and OSM responses to these comments. Copies of the final EIS will be sent only to those agencies and organizations listed in chapter 5, to those who comment on this draft EIS, and to those who specifically request a copy of the final EIS.

PREFACE

This environmental impact statement (EIS) analyzes the impacts on the human environment that would result from surface coal mining operations at Pacific Coast Coal Company's (PCCC) proposed John Henry No. 1 mine. A decision by the Office of Surface Mining Reclamation and Enforcement (OSM) on PCCC's permit application is required by the Surface Mining Control and Reclamation Act of 1977 (SMCRA).

This EIS consists of seven chapters. Chapter 1 describes the proposed action and the purpose of and need for the action and provides background information. Chapter 2 describes and compares the alternatives evaluated in this EIS for the decisionmaker and the public. The alternatives include: Alternative A, approval of the permit application with or without conditions and issuance of a Federal permit, and alternative B, disapproval of the permit application. Alternative A is the OSM preferred alternative.

Chapter 3 describes the existing environment that would be affected by the proposed action. Chapter 4 describes and analyzes the environmental impacts that would result from the proposed action.

Chapter 5 describes the consultation and coordination with the public and other agencies that occurred during the preparation of this EIS and lists those from whom comments are being solicited. Chapter 6 lists, with their qualifications, the individuals who prepared the environmental analyses and prepared this document. References cited in this document are listed in chapter 7.

SUMMARY

This environmental impact statement (EIS) analyzes the impacts on the human environment that would result from surface coal mining operations at Pacific Coast Coal Company's (PCCC) proposed John Henry No. 1 mine. The analysis was prepared by an interdisciplinary team of personnel from the Office of Surface Mining Reclamation and Enforcement (OSM).

PCCC has submitted a permit application to OSM in compliance with the requirements of the Federal Surface Mining Program for Washington (30 CFR 947 et seq.). OSM is required by the Surface Mining Control and Reclamation Act of 1977 (SMCRA) to make a decision on this application. This EIS analyzes both approval of the permit application with or without conditions to bring it into full compliance with the provisions of SMCRA and other applicable Federal laws (alternative A) and disapproval of the permit application (alternative B, equivalent to the "no action" alternative). Alternative A is OSM's preferred alternative. Other alternatives considered and rejected are described in chapter 2.

The proposed permit area is both on unincorporated lands within King County and on lands within the city limits of Black Diamond. Therefore, in addition to any OSM conditions to bring the permit application into compliance with Federal laws, the county and city may also stipulate conditions to their approvals. For mining to occur, the following county and city land use zoning changes would have to be made:

a. Unincorporated land in King County.--Area zoned for "General" use would have to be rezoned to "Quarrying and Mining."

b. Land within Black Diamond city limits.--Residentially zoned areas would have to be rezoned to "Mineral Extraction and Forestry." (Note: Part of the proposed permit area within the city limits is already zoned "Mineral Extraction and Forestry.")

The county land zoning change would not be required if the city of Black Diamond were to annex the King County lands. PCCC has requested both the county zoning change and the city annexation. In response to the zoning request, the King County Department of Planning and Community Development has prepared a draft environmental impact statement under the provisions of the Washington State Environmental Policy Act (SEPA) to assess the potential impacts resulting from a change in land use zoning.

0.1 BRIEF DESCRIPTION OF THE PROPOSAL

PCCC proposes to open the John Henry No. 1 surface coal mine near Black Diamond, King County, Washington, approximately 27 miles southeast of Seattle. The proposed life-of-mine permit area, comprising approximately 500 acres of rolling, second-growth timber and cut-over lands and containing one small lake and a marshy wetland, is used for timber production and associated wildlife habitat. Portions of the proposed permit area and adjacent areas were extensively mined by underground methods over the last 100 years. Current land uses of adjacent lands

include residential development, sand and gravel mining, surface coal mining, managed and unmanaged forest lands, and commercial services. PCCC would extract approximately 5.32 million tons of run-of-mine low sulfur bituminous coal during a 16.2-year period, construct and operate a coal processing facility at the minesite, and would disturb approximately 363 acres over the life of the mining and processing operation. The proposed John Henry No. 1 mine would contribute nearly 90 percent of the coal presently mined in that area. The coal would be marketed to commercial and industrial consumers in the Seattle and western Washington area and would replace coal presently supplied from diminishing area sources and from sources outside the region.

0.2 SUMMARY OF IMPACTS

If a permit were issued and mining were to take place, moderately significant impacts would occur to some resources on the minesite itself. The mining activity would disrupt topography, soils, and vegetation on 363 acres of the 82-square-mile Green River district, or 0.7 of 1 percent of the surface area of the district. The Green River mining district, located entirely in south-central King County, is one of the two major coal-bearing areas in the county. Impacts on surface and ground water, wildlife, and adjacent land uses and residents would be moderately significant. The mine would not interfere with future development and use of the area's renewable resources. Transportation facilities to accommodate the mine already exist, anh no threatened or endangered species are known to be present within the permit area.

The John Henry No. 1 mine would have adverse impacts upon residential developments adjacent to the permit area boundary. These impacts, including visual intrusions by the active mining operation on the landscape and noise, would occur during the entire life of the operation. Increased motor vehicle traffic on area roads would occur as a result of coal trucks leaving and returning, and during work force shift changes. This traffic load would become negligible as workers and coal trucks become dispersed over the regional road networks. No shortage of housing would occur, and negligible impacts would occur to locally provided public services, such as schools, recreational facilities, or sewer and water services, because most of the mine's work force would come from surrounding areas and would not have to relocate from outside the area. PCCC proposes to develop its own supplies of water for coal processing, fire protection, and other purposes, and there would be no impact on existing public water services.

If OSM did not approve the permit application and did not issue a Federal permit, the adverse environmental impacts associated with the approval alternative would not occur. Any mining or other resource uses needed to meet energy demands would occur elsewhere. The current uses of the land for timber production and wildlife habitat would not change unless the area were developed for residential dwelling units, as is currently allowed under the city of Black Diamond's and King County's zoning, or possibly for another use if the area were rezoned. There would be economic impacts. State and local governments would not realize the projected annual $1.14 million to $1.24 million in tax revenues once the mine reaches full production, and an opportunity to provide increased employment to area people would be lost.

CONTENTS

	Page
Cover sheet	iii
Preface	v
Summary	vii
0.1 Brief description of the proposal	vii
0.2 Summary of impacts	viii
Chapter 1: Introduction	1-1
1.1 Proposed Federal action	1-1
1.2 Need for Federal action	1-1
1.3 Scope of the analysis	1-1
1.4 Applicant's proposal	1-3
1.5 Other activities in the area	1-12
Chapter 2: Alternatives	2-1
2.1 Alternative A: Approval of the permit application with or without conditions and issuance of a Federal permit	2-1
2.2 Alternative B: Disapproval of the permit application	2-1
2.3 Comparison of the alternatives	2-2
Chapter 3: Description of the affected environment	3-1
3.1 Topography	3-1
3.2 Geology	3-1
3.3 Water resources	3-7
3.3.1 Surface water	3-7
3.3.2 Ground water	3-10
3.4 Climate	3-18
3.5 Air quality	3-18
3.6 Soil resources	3-18
3.6.1 Soils	3-18
3.6.2 Overburden	3-19
3.7 Vegetation	3-24
3.8 Wildlife resources	3-25
3.8.1 Mammals	3-26
3.8.2 Birds	3-26
3.8.3 Herptiles	3-26
3.8.4 Fish	3-26
3.8.5 Threatened, endangered, and other sensitive species	3-26
3.9 Land use	3-27
3.10 Socioeconomics	3-30
3.10.1 Background and definition of the study area	3-30
3.10.2 Population	3-31
3.10.3 Employment and the economy	3-32
3.10.4 Housing	3-32
3.10.5 Public services and infrastructure	3-32

	Page
Chapter 3: Description of the affected environment--Continued	
3.10 Socioeconomics--Continued	
3.10.6 Fiscal situation	3-33
3.10.7 Transportation system	3-33
3.10.8 Social setting	3-34
3.11 Recreation	3-34
3.12 Noise	3-34
3.13 Visual resources	3-36
3.14 Cultural resources	3-37
Chapter 4: Environmental consequences	4-1
4.1 Topography	4-1
4.2 Geology	4-2
4.3 Water resources	4-2
4.3.1 Surface water	4-2
4.3.2 Ground water	4-5
4.3.3 Water rights	4-6
4.4 Climate	4-7
4.5 Air quality	4-7
4.6 Soil resources	4-11
4.7 Vegetation	4-12
4.8 Wildlife	4-12
4.8.1 Terrestrial communities	4-12
4.8.2 Aquatic communities	4-13
4.8.3 Threatened, endangered, and other sensitive species	4-14
4.9 Land use	4-14
4.10 Socioeconomics	4-15
4.10.1 Employment needs and sources	4-15
4.10.2 Induced employment	4-16
4.10.3 Employment and population effects	4-17
4.10.4 Housing	4-18
4.10.5 Public facilities and services	4-18
4.10.6 Fiscal effects	4-19
4.10.7 Transportation effects	4-19
4.10.8 Social effects	4-23
4.10.9 Other impacts	4-23
4.10.10 Issues of concern and mitigation activities	4-24
4.11 Recreation	4-24
4.12 Noise and vibration	4-25
4.13 Visual resources	4-29
4.14 Cultural resources	4-29
4.15 Safety	4-30
4.16 The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity	4-30
4.17 Irreversible and irretrievable commitment of resources	4-32
Chapter 5: Consultation and coordination, public participation, and review	5-1
Chapter 6: Preparers and contributors	6-1

	Page
Chapter 7: References cited	7-1
Appendix A. The applicant's proposal	A-1
Mining	A-1
Reclamation	A-9
Appendix B. Correspondence concerning cultural resources	B-1
Appendix C. Surface-water quality data	C-1
Appendix D. Overburden permeability and ground-water quality data	D-1
Appendix E. Correspondence concerning threatened and endangered species of wildlife	E-1

ILLUSTRATIONS

		Page
Figure 1.3-1	The general location of the proposed John Henry No. 1 mine.	1-4
1.3-2	The location of the proposed John Henry No. 1 life-of-mine permit boundary in relation to the Black Diamond city limits and unincorporated King County lands.	1-5
1.3-3	Surface ownership of the proposed permit and adjacent areas.	1-6
1.3-4	Coal ownership of the proposed permit and adjacent areas.	1-7
1.3-5	Existing and past land uses of the proposed John Henry No. 1 minesite and surrounding areas.	1-11
3.1-1	The topography of the proposed 7-year permit and life-of-mine areas.	3-2
3.2-1	Typical stratigraphic section of Black Diamond anticline.	3-4
3.2-2	Coal seam outcrops and areas of abandoned underground mines on and adjacent to the proposed mine area.	3-5
3.2-3	Principal structural features in the vicinity of the proposed mining operation.	3-6

			Page
Figure	3.3.1-1	The three surface water drainage basins that operation.	3-8
	3.3.1-2	Maximum, average, and minimum monthly flows for the basins of Lake No. 12 Creek, Mud Lake Creek, Ginder Lake Creek, and Ginder Creek.	3-11
	3.3.2-1	The location of domestic wells adjacent to the proposed mining area and boreholes on the proposed mining area.	3-13
	3.3.2-2	Ground-water potentiometric contour map.	3-15
	3.3.2-3	Pump test results for borehole 81-2.	3-17
	3.9-1	The location of the proposed John Henry No. 1 life-of-mine area and 7-year permit boundary in relation to the Black Diamond city limits and King County lands zoned for general use and forestry and recreation use.	3-28
	3.9-2	The location of the proposed John Henry No. 1 life-of-mine area and 7-year permit boundary in relation to the Black Diamond city limits, zoned lands within the city limits, and lands classified by the city outside the city limits.	3-29
	3.12-1	HUD criterion for non-aircraft noise in residential areas outdoors.	3-36
	4.3.1-1	The three surface-water drainage basins after mining and reclamation.	4-3
	4.5-1	Increase in annual average TSP concentrations in the eleventh year of operation at the John Henry No. 1 mine.	4-10
	4.12-1	Locations of proposed earth berms to mitigate noise levels and meet county and State noise regulations.	4-26
	4.12-2	Locations of residential properties adjacent to the proposed minesite for which mitigation measures would be taken by the applicant to meet county and State maximum permissible sound levels.	4-28

			Page
Figure	A-1	Geologic profile of the proposed John Henry No. 1 mine showing locations of coal seams in Pits 1 and 2.	A-3
	A-2	The location of the John Henry No. 1 surface coal mining operation disturbances.	A-4
	A-3	Artist's conception of the proposed general arrangement of the John Henry No. 1 mine coal preparation plant.	A-5
	A-4	Postmining topography and land use of the proposed John Henry No. 1 mine.	A-13
	D-1	Results of packer permeability tests on borehole 83-3.	D-1

TABLES

			Page
Table	1.3-1	Data for the proposed John Henry No. 1 mine.	1-9
	1.3-2	Projected annual disturbance, coal production, reclamation, and employment.	1-10
	3.3.1-1	Acreages of the three drainage basins, portions of which would be affected by the proposed mine.	3-9
	3.3.1-2	Discharge from Lake No. 12 and adjacent lake/swamp system.	3-9
	3.3.1-3	Premining floodflows for the basins of Ginder Creek, Ginder Lake, Mud Lake Creek, and Lake No. 12 Creek.	3-12
	3.3.1-4	Comparison of NPDES effluent standards for a 10-year, 24-hour or lesser precipitation event with the premining water-quality conditions for Ginder Lake, Ginder Creek, Mud Lake, and Lake No. 12.	3-12
	3.3.2-1	Data on eight domestic wells in the area adjacent to the proposed mining area.	3-14
	3.3.2-2	Premining water-level monitoring results for one domestic well and eight boreholes, February-August 1982.	3-16

			Page
Table	3.6.1-1	Characteristics and potential uses of the soil resources on the proposed John Henry No. 1 minesite.	3-20
	3.6.1-2	Soil series classified according to the current classification system and the revised 1938 system.	3-22
	3.6.1-3	Suitabilities of the dominant soil series for use in reclamation of drastically disturbed lands.	3-23
	3.10.2-1	Population of Black Diamond, Washington, 1970-83.	3-31
	3.12-1	Ambient noise levels.	3-35
	4.5-1	Particulate emission factors and control efficiency for selected mining activities.	4-8
	4.5-2	Summary of controlled particulate emissions from mining-related activities during the eleventh year of the operation.	4-9
	4.10.1-1	Employment needs of the proposed John Henry No. 1 mine.	4-16
	4.10.2-1	Induced employment estimates.	4-17
	4.10.6-1	Estimated annual tax revenues from development of the John Henry No. 1 mine.	4-20
	4.10.7-1	Increase in coal haul truck traffic.	4-21
	4.12-1	Sound mitigation measures and projected worst-case sound levels at receiving residential properties.	4-27
	A-1	Data for John Henry No. 1 mine.	A-2
	A-2	Tonnage of run-of-mine coal and clean coal, and volume of spoil and coal processing waste produced during the initial 7-year permit term.	A-6
	A-3	Tonnage of run-of-mine coal and clean coal, and volume of spoil and coal processing waste produced during years 8 through 16 of the surface coal mining operation.	A-7
	A-4	Schedule for reclaiming disturbed acreages.	A-10

CHAPTER 1

INTRODUCTION

1.1 PROPOSED FEDERAL ACTION

The "proposed Federal action" is defined for the purposes of this environmental impact statement (EIS) as approval or disapproval of the surface coal mining permit application submitted by the Pacific Coast Coal Company (PCCC) for the John Henry No. 1 mine. Under the approval alternative, OSM could identify conditions that must be appended to the permit application to bring it into compliance with Federal requirements. King County and the city of Black Diamond may also separately require conditions prior to giving their approvals for mining.

1.2 NEED FOR FEDERAL ACTION

In accordance with provisions of Section 504 of the Surface Mining Control and Reclamation Act of 1977 (SMCRA; P.L. 95-87), the Office of Surface Mining Reclamation and Enforcement (OSM) implemented a Federal program on May 16, 1983, (48 F.R. 22291) for the regulation of coal mining activities within the State of Washington. Subsequently, PCCC submitted a permit application for its proposed John Henry No. 1 mine to OSM on May 27, 1983. Therefore, the Director of OSM is required under SMCRA to make a decision on whether to issue a permit for mining at the proposed operation. OSM has reviewed the permit application and has determined that its decision on issuance of a permit constitutes a major Federal action significantly affecting the quality of the human environment under Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.). This EIS analyzes the impacts that would result under the alternatives available to OSM.

1.3 SCOPE OF THE ANALYSIS

OSM has prepared this EIS to analyze the environmental impacts of the proposed John Henry No. 1 mine. The impacts discussed focus on the proposed permit area and include direct impacts from mining, offsite impacts caused by mining, such as changes in hydrologic conditions and air quality, and other impacts, primarily social and economic, resulting from increased employment and economic activity. The analysis also extends beyond the permit area to the remainder of the life-of-mine area.

OSM has made no final decision on whether PCCC's proposed 32.5-acre, 250-foot-deep lake and resultant permanent out-of-pit spoil storage pile would meet regulations pertaining to restoration of approximate original contour and postmining land use objectives. Therefore, for the purposes of environmental impact analyses in chapter 4, OSM developed and analyzed three possible mining and reclamation scenarios: (1) the lake as proposed by PCCC, (2) a lake with a depth comparable to that in surrounding lakes, and (3) no lake and a return of the area to approximate original contour.

Much of the technical information used in this analysis is contained in PCCC's complete permit application for the John Henry No. 1 mine (Pacific Coast Coal Company, Inc., 1983-84) and in the draft EIS and a supplemental draft EIS (King County, Washington, 1982, 1983) prepared by the King County Department of Planning and Community Development under the provisions of the Washington State Environmental Policy Act of 1971 (SEPA). The SEPA draft EIS was prepared in response to a request by PCCC for a land use zoning change; it was released in November 1982 and supplemented in May 1983. The discussions of impacts in chapter 4 are based upon this information. The documents are incorporated by reference in this EIS.

Copies of the SEPA documents are available for public review at the offices of:

King County Department of Planning
and Community Development
Attn.: David Feltman
450 King County Administration Building
Seattle, Washington 98104
(telephone: (206) 344-5286)

Office of Surface Mining
Western Technical Center
Attn.: Charles Albrecht
Brooks Towers
1020 - 15th Street
Denver, Colorado 80202
(telephone: (303) 837-5421)

Copies of the permit application are available for review at the following locations:

Office of Surface Mining
Attn.: Bob Flowers
c/o U.S. Fish and Wildlife Service
2625 Parkmont Lane, S.W., Building B3
Olympia, Washington 98502
(telephone: (206) 753-9440)

Office of Surface Mining
Western Technical Center
Attn.: Charles Albrecht
Brooks Towers
1020 - 15th Street
Denver, Colorado 80202
(telephone: (303) 837-5421)

Washington Department of Natural Resources
Attn.: Ray Lasmanas
Division of Geology and Earth Resources
4224 S.E. 6th Avenue
Rowe 6, Building No. 1
Lacey, Washington 98503
(telephone: (206) 753-1262)

Washington Department of Ecology
Attn.: Greg Sorlie
Environmental Review Section
Abbot Raphael Hall
St. Martins College Campus
Olympia, Washington 98504
(telephone: (206) 459-6000)

Maple Valley Public Library
23730 Maple Valley
Black Diamond Road, S.E.
Maple Valley, Washington 98038
(telephone: (206) 432-4620)

1.4 APPLICANT'S PROPOSAL

PCCC's proposed John Henry No. 1 minesite is located in King County, Washington, approximately 27 miles southeast of Seattle (fig. 1.3-1). The proposed permit area lies adjacent to and is partially within the incorporation limits of the city of Black Diamond (fig. 1.3-2). The applicant has initially proposed a 7-year permit term area of approximately 422 acres, which would be part of a larger 500-acre life-of-mine area to be mined over a 16.2-year period of time. (Note: Section 30 CFR 947.773.19(c) of the regulations states that the permit term shall not exceed 5 years except where the applicant shows that a specified longer time period is needed to allow the applicant to obtain necessary financing of equipment and the opening of the operation. In accordance with this regulation, PCCC has applied for a 7-year permit term. OSM is currently analyzing this proposal.) The proposed mining area is rolling, second growth and recently cut-over timberlands. One natural lake lies within the permit area, as does the remnants of a manmade lake that breached in late 1971 and is now a wetland. Present land uses within the proposed permit area are managed timberlands and wildlife habitat. Portions of the proposed permit area and adjacent lands were extensively mined by underground mining methods over the past 100 years. There is a small (10,000 tons per year) surface coal mine adjacent to the proposed permit area which has an anticipated remaining productive life of 3 to 4 years. Other uses of the adjacent lands are permanent and seasonal residential development, including a lakeshore residential development immediately adjacent to the proposed permit area, commercial development, managed and unmanaged timberlands, and wildlife habitat. Both land surface and mineral estates are privately owned, and PCCC has obtained the appropriate rights for mining and surface access through leases. Figures 1.3-3 and 1.3-4 show the land surface and coal ownership of the proposed permit and adjacent areas.

PCCC proposes to extract a combined total of 5.32 million short tons of run-of-mine coal from two pits during a 16.2-year life-of-mine period. Six bituminous coal seams are proposed for mining: the Franklin Nos. 7, 8, 9, and 10 seams would be mined from Pit 1 and the Franklin No. 12 and the Big Dirty seams would be mined from Pit 2. All six seams are pitching from 30^{o} to 45^{o}. Coal would be extracted to a depth of 250 feet below ground surface in an open-pit mine configuration, advancing along the coal seam subcrops, parallel to the geologic strike. A heavy-media-separation coal processing facility of closed-circuit design would be constructed within the permit area to "wash" impurities from the run-of-mine coal. It is anticipated that approximately 35 percent of the run-of-mine coal

436-784 O - 84 - 2 : QL 3

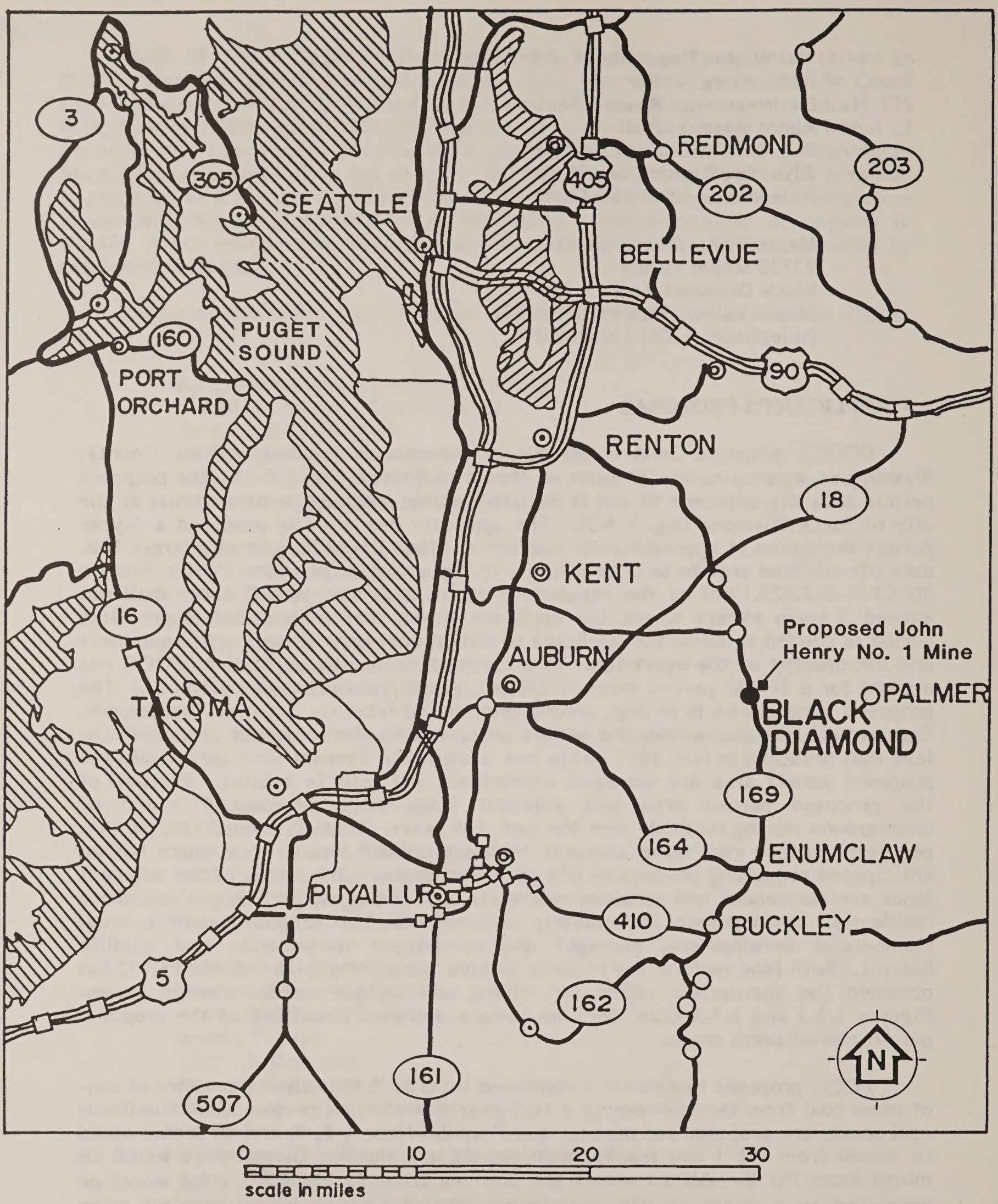


Figure 1.3-1.--The general location of the proposed John Henry No. 1 mine (Source: Modified from Systems Architects Engineers, Inc., 1982).

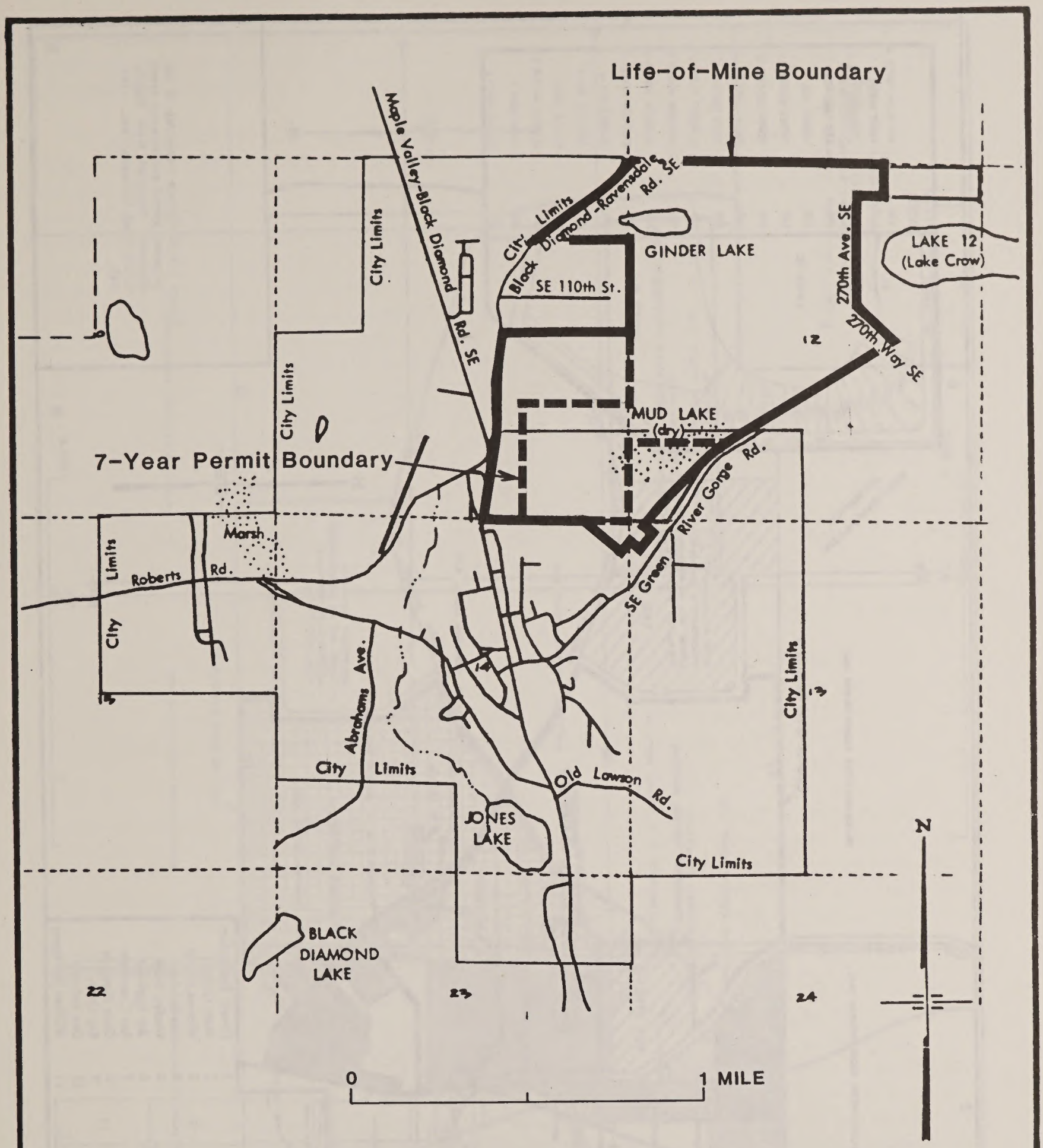
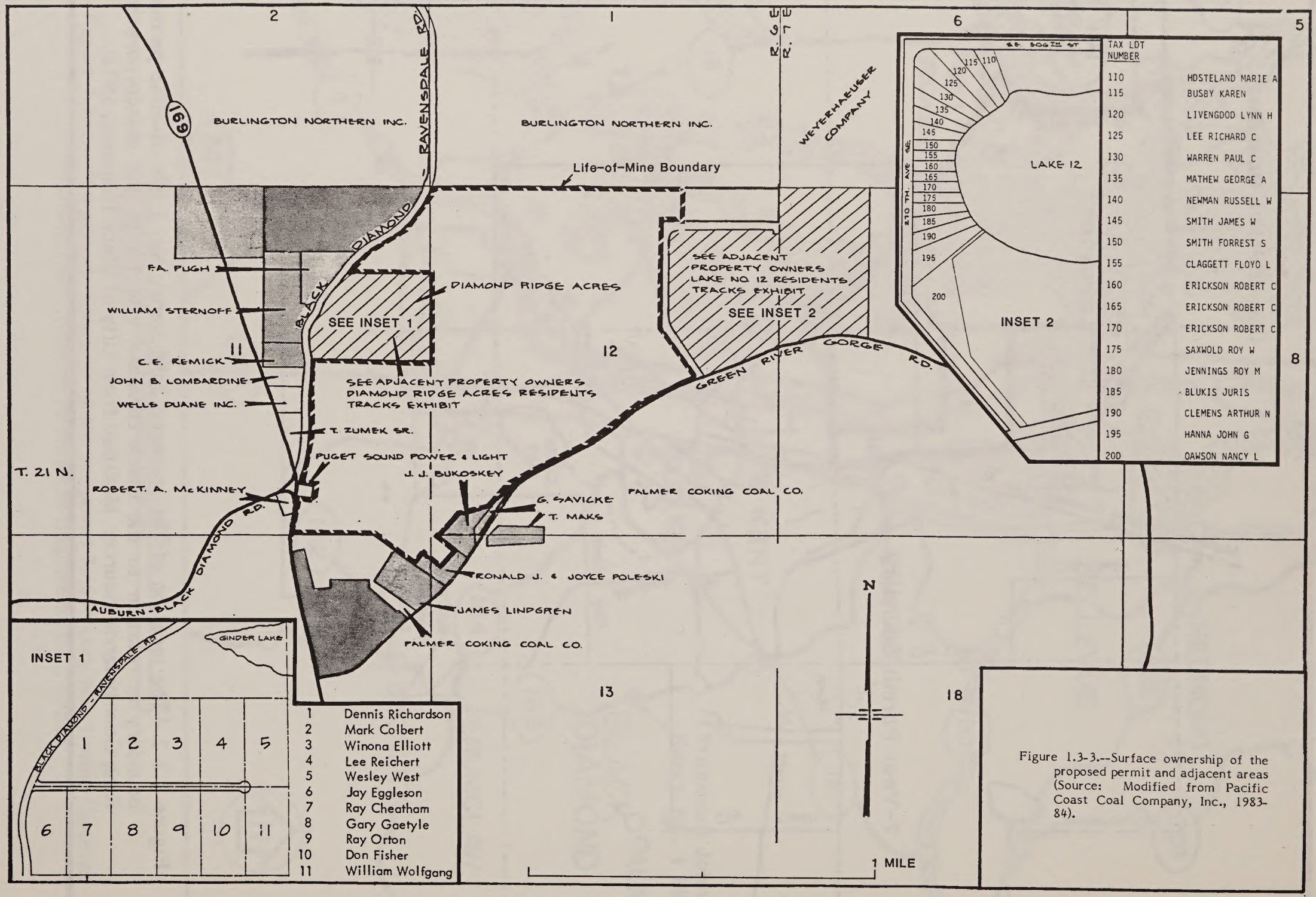


Figure 1.3-2.--The location of the proposed John Henry No. 1 life-of-mine permit boundary in relation to the Black Diamond city limits and unincorporated King County lands (Source: Modified from City of Black Diamond, 1982).



TAX LOT NUMBER	
110	HOSTELAND MARIE A
115	BUSBY KAREN
120	LIVENGOOD LYNN H
125	LEE RICHARD C
130	WARREN PAUL C
135	MATHEW GEORGE A
140	NEWMAN RUSSELL W
145	SMITH JAMES W
150	SMITH FORREST S
155	CLAGGETT FLOYD L
160	ERICKSON ROBERT C
165	ERICKSON ROBERT C
170	ERICKSON ROBERT C
175	SAXWOLD ROY W
180	JENNINGS ROY M
185	BLUKIS JURIS
190	CLEMENS ARTHUR N
195	HANNA JOHN G
200	DAWSON NANCY L

1	Dennis Richardson
2	Mark Colbert
3	Winona Elliott
4	Lee Reichert
5	Wesley West
6	Jay Eggleson
7	Ray Cheatham
8	Gary Gaetyle
9	Ray Orton
10	Don Fisher
11	William Wolfgang

Figure 1.3-3.--Surface ownership of the proposed permit and adjacent areas (Source: Modified from Pacific Coast Coal Company, Inc., 1983-84).

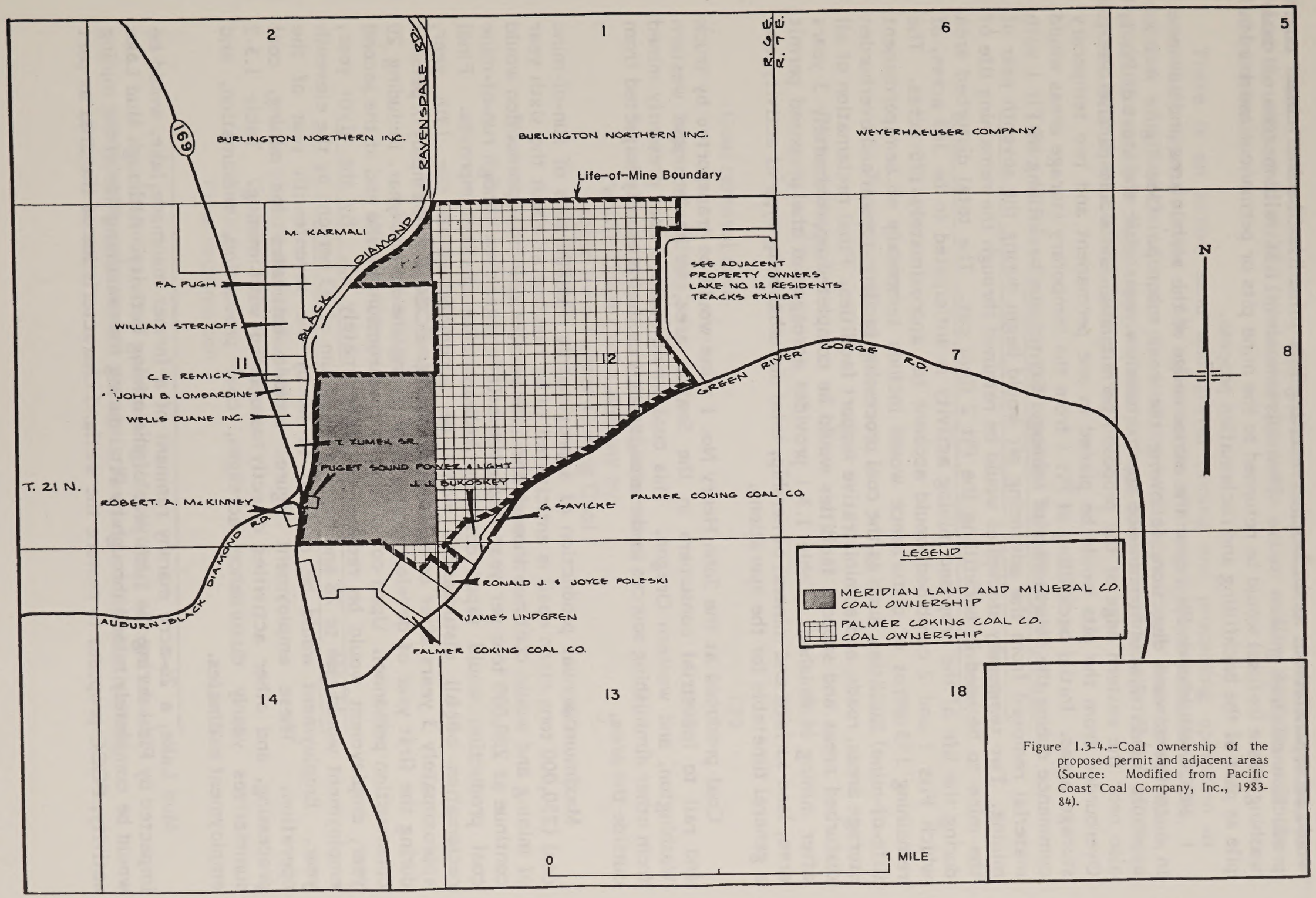


Figure 1.3-4.--Coal ownership of the proposed permit and adjacent areas (Source: Modified from Pacific Coast Coal Company, Inc., 1983-84).

would be separated out as impurities, resulting in a total life-of-mine "clean" coal production of 3.46 million tons. The approximately 1.86 million tons of coal washing waste (refuse) would be returned to the mine pits or permanent overburden pile as part of the backfilling and reclamation process.

PCCC would open Pit 1 near the eastern edge of the permit area and advance in a southwestward direction, following the coal subcrop. (See figure A-2 in appendix A.) Pit 2 would commence approximately 4 years after the start of Pit 1, also near the eastern edge of the proposed permit area, and would parallel Pit 1. Overburden from the pits would be placed in one permanent and two temporary storage areas. Initial backfilling of Pit 1 from the temporary storage areas would commence during the fourth year of mining. Continuous backfilling of Pit 1 with material removed from the advancing pit would begin during the seventh year of mining. Two temporary stockpiles would be retained through the remaining life of the mine to be used in backfilling the Pit 2 final cut. The total disturbed area during the life of the proposed mining activity is anticipated to be 363 acres, of which Pits 1 and 2 combined would account for approximately 170 acres. The remaining 193 acres of disturbance would include temporary or semipermanent (life-of-mine) facilities, such as the coal processing facility, topsoil and overburden storage areas, roads, and administrative support facilities. Final reclamation of all disturbed areas and support facilities would be completed approximately 3 years after mining is finished. Table 1.3-1 provides acreages of the proposed permit area, land surface and mineral ownership, total disturbance by type of activity, and a general timetable for the operations.

Coal produced at the John Henry No. 1 mine would be transported by truck and rail to industrial consumers in the Seattle area, in eastern and western Washington, and western Oregon. This coal would replace coal presently mined from other diminishing sources in the area, as well as that presently imported from outside the area.

Maximum annual production of approximately 385,000 tons of run-of-mine coal (250,000 tons clean coal) is anticipated to be reached at about the sixth year of mining and would continue through the 13th year. Clean coal production would continue at 250,000 tons per year through the 16th year, even though run-of-mine coal production would taper down as in-seam coal quality improves. Final reclamation of all disturbances would be accomplished in the 19th year, approximately 3 years after completion of mining. PCCC would employ 7 persons during the first year of development and 80 during the second year, including 20 construction personnel. Upon completion of construction, by the end of the second year, employment would be reduced to approximately 65. By the sixth year, employment would rise to 78 and reach a maximum of 93 persons by the eleventh year. Employment would be reduced to 60 by the seventeenth year of the operation. These employment figures include estimates for mining, coal processing, and other activities directly associated with mining. Table 1.3-2 summarizes yearly disturbance acreages, coal production, reclamation, and employment estimates.

Mud Lake, a 26-acre marshy remnant of a former manmade lake, would be impacted by Pit 1 during the fifth year of the mining activity. Although Mud Lake would be completely mined through by Pit 1 during the remaining life of the mining activity, PCCC proposes to restore the wetland characteristics of the area as part

of the total reclamation plan. Appropriate surface-water diversion structures would be utilized to direct flows away from the active mining operations in the Mud Lake basin.

There is an active sand and gravel mining and processing operation at Ravensdale, approximately 1-3/4 miles north of the proposed John Henry No. 1 minesite. An associated open pit sand mine is located just east of the Black Diamond-Ravensdale Road approximately three-quarters of a mile north of the proposed permit area boundary (fig. 1.3-5).

Table 1.3-1.--Data for the proposed John Henry No. 1 mine

	Acres involved
Permit area:	
Life of mine	500
7-year permit term	422
Disturbed area:	
Life of mine	363
7-year permit term	204
Coal removal area	170
Support facilities[1]	193
Surface ownership within life-of-mine area:	
Pacific Coast Coal Company by lease from Palmer Coking Coal Company	500
Mineral ownership within the life-of-mine area:	
Pacific Coast Coal Company by lease from Palmer Coking Coal Company	356
Pacific Coast Coal Company by lease from Meridian Land and Mineral Company	144
	Years
Life of mine and reclamation:	19
Construction/development	1
Mining	2-16
Final reclamation	16-19

[1]Includes coal processing facilities, access roads, overburden and topsoil storage areas, and administrative and support areas.

Table 1.3-2.--Projected annual disturbance, coal production, reclamation, and employment

Year of operation	Acreage disturbed			Run-of-mine coal production (1,000 tons)			Reclaimed acreage	Employment	
	Mining	Support	Total	Pit 1	Pit 2	Total		Mining	Construction
(1984)									
1	---	14.4	14.4	130	---	130	---	7	---
2	21.5	46.0	67.5	160	---	160	---	60	20
3	9.8	31.7	41.5	175	---	175	27.6	65	---
4	16.9	0.6	17.5	140	80	220	---	65	---
5	10.7	45.6	56.3	305	75	380	---	65	---
6	11.3	---	11.3	250	135	385	4.4	78	---
(1990)									
7	10.1	---	10.1	265	115	385	5.6	78	---
8	13.3	---	13.3	232	153	385	5.2	78	---
9	18.0	9.2	27.2	229	156	385	10.7	78	---
10	14.0	3.1	17.1	238	147	385	13.6	78	---
11	17.6	10.1	27.7	253	132	385	14.0	93	---
12	0.8	---	0.8	241	144	385	11.4	93	---
13	7.8	11.7	19.5	245	140	385	18.0	93	---
14	6.7	---	6.7	233	147	380	9.7	93	---
15	12.3	15.4	27.7	253	123	376	8.7	66	---
16	---	---	---	36	329	365	6.2	66	---
(2000)									
17	---	3.1	3.1	---	55	55	53.5	60	---
18	---	1.8	1.8	---	---	---	74.0	45	---
19	---	---	---	---	---	---	100.9	30	---
Total	170.8	192.7	363.5	3,385	1,931	5,316	363.5	NA	NA

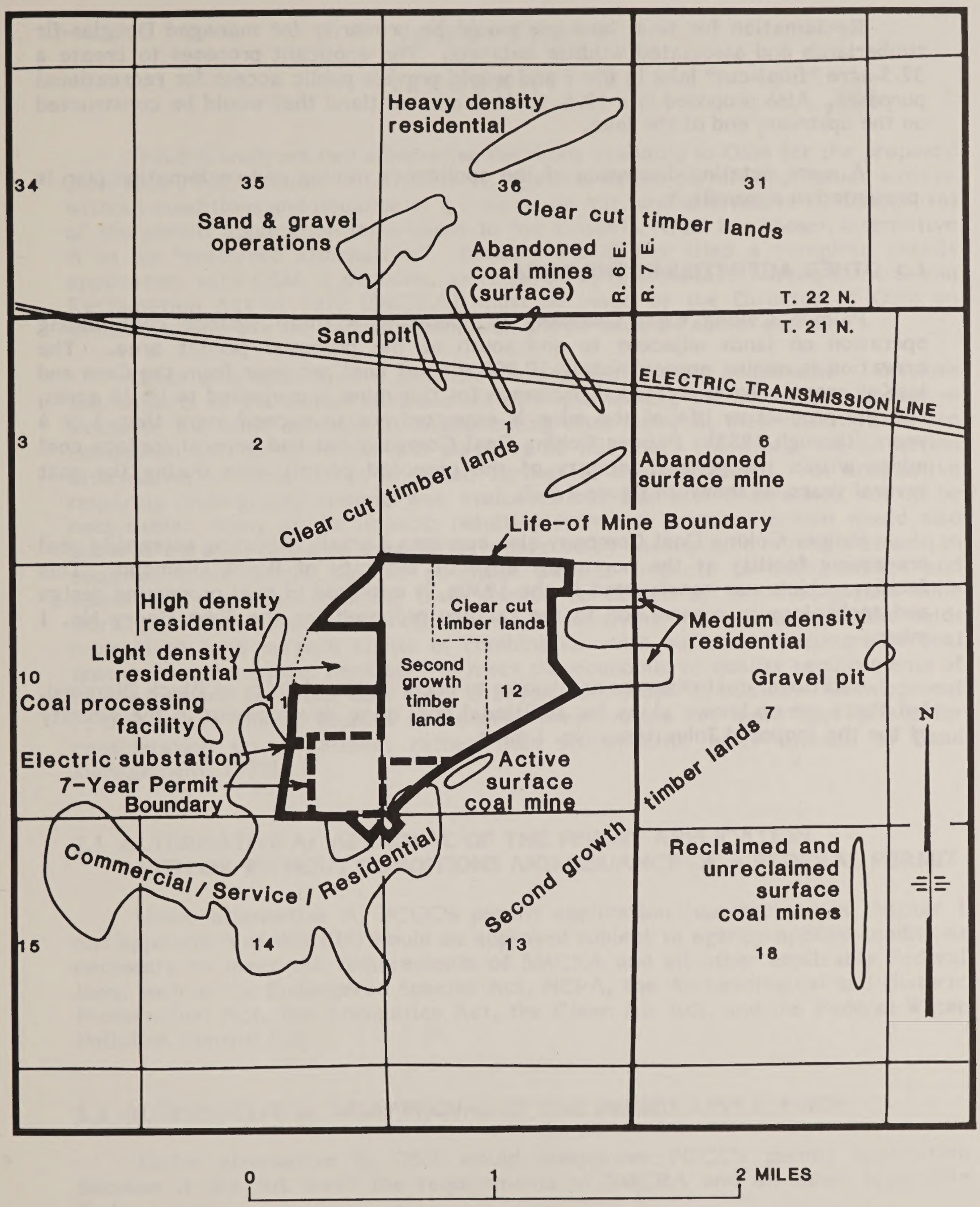


Figure 1.3-5.--Existing and past land uses of the proposed John Henry No. 1 minesite and surrounding areas.

Reclamation for final land use would be primarily for managed Douglas-fir timberlands and associated wildlife habitats. The applicant proposes to create a 32.5-acre "final-cut" lake in Pit 1 and would provide public access for recreational purposes. Also proposed is a 12.5- to 14.0-acre wetland that would be constructed on the upstream end of the lake.

A more detailed discussion of the applicant's mining and reclamation plan is presented in appendix A.

1.5 OTHER ACTIVITIES IN THE AREA

Palmer Coking Coal Company is operating a small surface coal mining operation on lands adjacent to and south of the proposed permit area. The operation is mining approximately 10,000 tons of coal per year from the Gem and McKay seams. Total surface disturbance for this mine is projected to be 18 acres, and the productive life of the mine is expected not to exceed more than 3 or 4 years (through 1988). Palmer Coking Coal Company has had several surface coal mines within the general vicinity of the proposed permit area during the past several years, as shown in figure 1.3-5.

Palmer Coking Coal Company also operates a small, vibrating screen/jig coal processing facility at the northwest edge of the city of Black Diamond. This facility, which was constructed in the 1930's, is outdated in coal processing design and technology in comparison to the facility proposed for the John Henry No. 1 mine.

Additional coal reserves are known to occur in the vicinity of Black Diamond, but there are no known plans for additional coal mine development in the vicinity of the the proposed John Henry No. 1 mine.

CHAPTER 2

ALTERNATIVES

This EIS analyzes two alternative decisions available to OSM for the proposed John Henry No. 1 mine: Alternative A, approval of the permit application with or without conditions and issuance of a Federal permit, and alternative B, disapproval of the permit application (equivalent to "no action"). OSM has chosen alternative A as its "preferred alternative." Because PCCC has filed a complete permit application with OSM, a decision, as required by the Surface Mining Control and Reclamation Act of 1977 (SMCRA), must be made by the Director of OSM on whether to approve the permit application and to issue a Federal permit.

Other alternatives were identified but were found not reasonable. Because the impacts to the human environment of implementing the no action alternative would be the same as those of implementing alternative B, these alternatives are considered as equivalent for the purposes of this EIS. Therefore, the no action alternative, as such, is not analyzed further in this document. An alternative requiring underground mining was evaluated but was also determined not to be reasonable. Many of the impacts resulting from the proposed action would also occur if the coal resource were to be recovered by underground mining methods; in addition, there would also be potential adverse impacts to both surface and subsurface resources resulting from subsidence caused by the underground mine workings. The consideration of alternative locations where the applicant holds mineral or land surface rights in combination with sufficient recoverable coal quantities and qualities necessary to meet the economic or quality requirements of committed and potential coal users is beyond the scope of this EIS. Development of alternative energy sources and energy conservation are more appropriate for consideration on a national rather than site-specific basis (Bureau of Land Management, 1979).

2.1 ALTERNATIVE A: APPROVAL OF THE PERMIT APPLICATION WITH OR WITHOUT CONDITIONS AND ISSUANCE OF A FEDERAL PERMIT

Under alternative A, PCCC's permit application (summarized in chapter 1 and appendix A of this EIS) would be approved subject to agency-applied conditions necessary to meet the requirements of SMCRA and all other applicable Federal laws, such as the Endangered Species Act, NEPA, the Archaeological and Historic Preservation Act, the Antiquities Act, the Clean Air Act, and the Federal Water Pollution Control Act.

2.2 ALTERNATIVE B: DISAPPROVAL OF THE PERMIT APPLICATION

Under alternative B, OSM would disapprove PCCC's permit application because it did not meet the requirements of SMCRA and all other applicable Federal laws.

2.3 COMPARISON OF THE ALTERNATIVES

Environmental impacts that would occur if alternative A were approved are analyzed in detail in chapter 4.

The following describes the impacts that would occur if the mine is developed as proposed:

- According to the mining and reclamation scenario utilized, impacts to the topography of the mine area would range from moderately significant (scenarios 1 and 2) to minor (scenario 3).

- During mining, the overburden, soils, and vegetation on as much as 363 acres of the minesite would be progressively disturbed. Changes in stratigraphy would be permanent. Soil structure would be radically changed but would re-form over time. Although the area would support a land use similar to that before mining (managed timberlands and wildlife), postmining vegetation would be different from the existing vegetation, owing to the conversion of the area to a Douglas fir plantation. Under proper forest management, the Douglas fir would reach a marketable size for saw timber (18-inch average diameter, 110- to 130-foot height) after 45 to 50 years. The diversity of terrestrial wildlife habitats would be decreased by the intensified forest management practices.

- Ground-water quality in the vicinity of the mine would deteriorate because of mining. Ground-water levels in the immediate vicinity of the mining operation would be lowered during mining by dewatering of the pit excavations. As a result, water levels in some of the domestic wells within 1,500 feet of the pit excavation limits would drop, some by several feet. During the life of the mine, the water level in adjoining Lake No. 12 would be reduced a maximum of 0.5 foot in summer owing to ground-water seepage into the pit excavations.

- Despite some degradation of air quality in the vicinity of the mine, the quality of the air would meet Federal and State standards. Traffic to and from the mine would contribute to congestion, increase noise levels, and add to maintenance requirements of the roads. When the mine is at full capacity, 33 trucks loaded with coal would leave the mine and return each day.

- The mine would directly employ a maximum of 93 persons and indirectly through induced employment a maximum of 23 to 46 persons during peak employment years (years 12 through 14 of the mining operations). Direct taxes to the city of Black Diamond, King County, the State of Washington, and other government and local tax-receiving entities would total approximately $1.14 million to $1.24 million per year for the 12.2 years of peak coal production (after the mine's initial 4-year buildup period).

- Thirty-three trucks loaded with coal would leave the mine and return each day during peak production years. The truck and other mine-related traffic would moderately increase traffic volumes, cause deterioration of roads (especially the Black Diamond-Ravensdale Road), create potential safety problems, and cause additional noise and dust.

- Residents adjacent to the mining operation would be subjected to increased noise caused by the mine and coal processing operations, blasting, and increased traffic. In approximately the fourth year of the mining operation, a second work force would be added , and the increased noise would occur from 7 a.m. through 12:30 a.m. Property values of adjacent homes and land may have already decreased due to the proposed mine. The decreased property values would likely continue through the 16.2-year life of the mine. Nearby residents would experience the anxieties associated with living near a mine.

- Mining and associated facilities would constitute a visual intrusion to the areas immediately adjacent to the minesite during the construction and active mining phases. This intrusion would be, for the most part, local, in that the minesite is located away from major viewing areas and most major travel routes and population centers. The facilities would be removed during reclamation, and the area would be returned to approximate natural conditions.

Under alternative B, 5.32 million tons of run-of-mine coal (3.46 million tons of clean coal) would not be removed for beneficial use, and a peak permanent work force of 93 persons would not be employed at the John Henry No. 1 mine. Annual tax revenues to the State and local governments of $1.14 million to $1.24 million as a direct result of the proposed project would not be realized. None of the impacts discussed in chapter 4 would occur at the John Henry No. 1 mine or adjacent areas. The current uses of the land for timber production and wildlife habitat would not change unless the area were developed for residential dwelling units, as is currently allowed under the city of Black Diamond's and King County's zoning, or possibly for another use if the area were rezoned.

CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

The majority of the information contained in this chapter comes, in certain instances, verbatim, from two sources: (1) PCCC's permit application (Pacific Coast Coal Company, Inc., 1983-84), and (2) King County's EIS on PCCC's requested zone change (King County, Washington, 1982, 1983).

3.1 TOPOGRAPHY

The proposed permit area is located in the southeastern portion of the Puget Sound lowland of northwestern Washington. The Puget Sound lowland is a broad, undulating glacial drift plain that lies between the Cascade Range to the east and the Olympic Mountains to the west. A few isolated hills interrupt the otherwise low-relief surface of the drift plain.

The glacial drift plain to the east and south of the proposed permit area has been dissected by the west-flowing Green River, which has cut a deep, narrow gorge in older strata along its course. The proposed mine area is located approximately 1½ miles west of the nearest approach of the Green River.

Surface elevations within the proposed permit area range from a maximum of 840 feet above mean sea level in the center, to a minimum of approximately 670 feet at the surface of Ginder Lake. The land surface rises to approximately 1,000 feet above mean sea level near Ravensdale, approximately 1½ miles north of Ginder Lake. To the southeast, the topography drops to about 780 feet at the saddle between Mud Lake and Lake No. 12, then rises 480 feet in approximately three-quarters of a mile to an elevation of 1,270 feet above mean sea level. The elevation at the western permit area boundary is approximately 660 feet and drops in a gently undulating fashion to 500 feet at Lake Sawyer, 1-3/4 miles to the northwest. Maximum slope steepness within the proposed permit area is approximately 35 percent along the southern shore of Ginder Lake. Figures 3.1-1 and A-2 (in appendix A) show the existing surface topography of the proposed permit and surrounding areas.

3.2 GEOLOGY

The proposed permit area is unconformably overlain by Pleistocene glacial drift and outwash. The thickness of this drift, known as the Vashon Drift, ranges from 0 to 70 feet in the vicinity of the proposed permit area and consists of two units. The upper till unit is a loosely compacted mixture of pebbles and cobbles in a yellow-brown to yellowish-gray sand and clayey silt mixture. This unit is considered to be glacial rock debris that was deposited as the ice of the glacier melted.

The lower till unit consists of a tightly compacted, unsorted mixture of pebbles, cobbles, and, rarely, boulders, all in a medium-gray matrix of sand, silt, and silty clay. Mullineaux (1965) stated that "This tight, dense till is regarded as

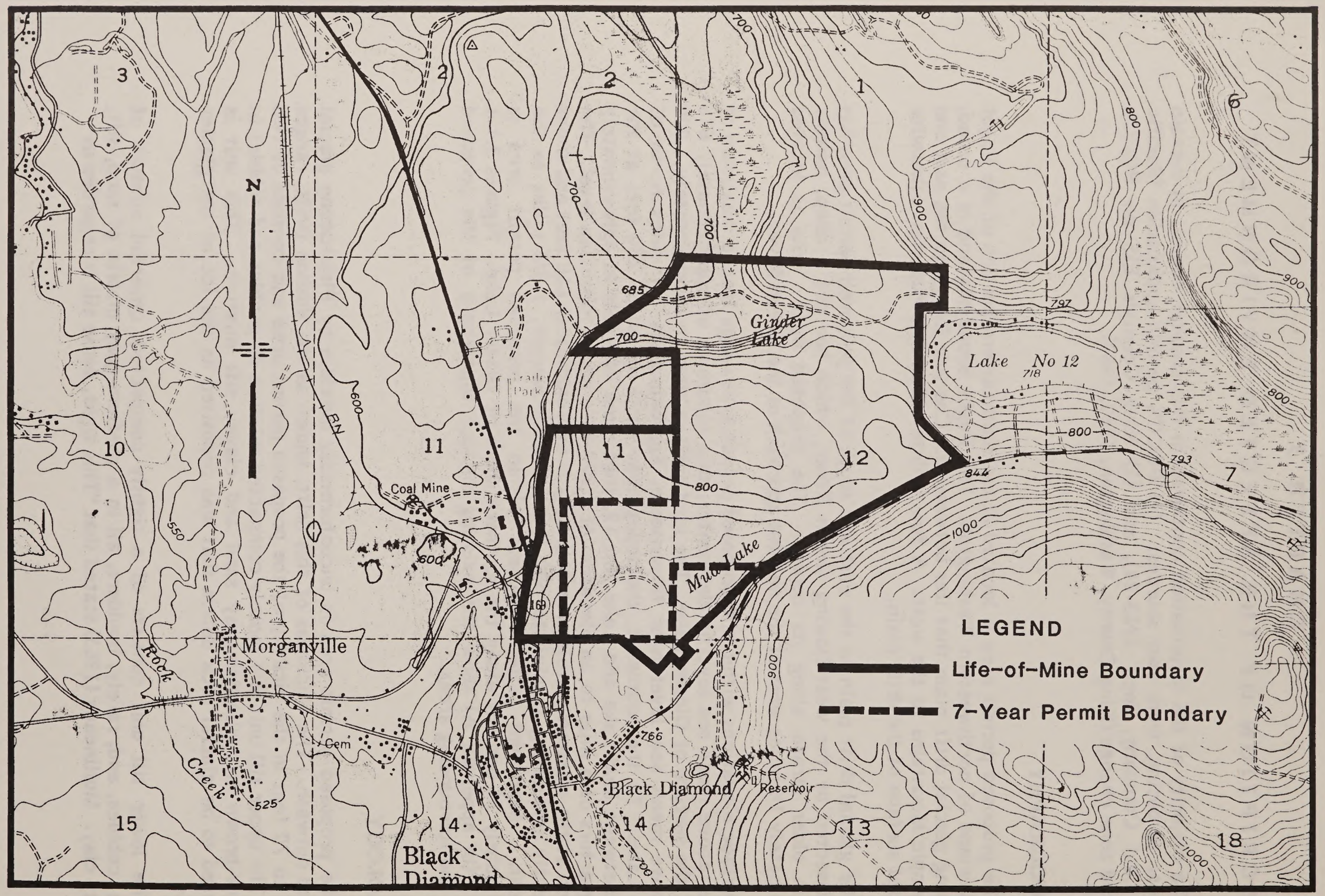


Figure 3.1-1.--The topography of the proposed 7-year permit and life-of-mine areas (Source: Modified from U.S. Geological Survey, Black Diamond and Cumberland, Washington, 7½-minute quadrangle maps).

lodgement till, deposited at the base of and compacted by the weight of the glacier. It generally is the 'hardpan' of local well drillers and construction workers."

The Puget Group of Eocene age consists of a thick sequence of interbedded arkosic sandstone, quartzose sandstone, siltstone, and numerous coal beds. Vine (1969) estimated that the Puget Group is comprised of 55 percent sandstone, 35 percent siltstone, and 10 percent shale, carbonaceous claystone, and coal. The sandstone is generally light gray to light brown to almost white, fine to medium grained, massive to flat and crossbedded, and micaceous to arkosic. In general, the sandstone in the upper portion of the group is softer and coarser grained than that in the lower part of the group. Some of the sandstone is shaly with common thin interstratified sandy shale beds. The thicker sandstone beds are usually cross-bedded and lenticular and probably represent channel deposits (Warren and others, 1945).

The siltstone of the Puget Group is medium to dark gray, sandy, and occasionally carbonaceous; the shale is commonly sandy, medium to dark gray, and massive to finely bedded; the claystone is light to dark gray, massive, and ferruginous to carbonaceous; and the coal beds generally consist of interstratified coal, impure coal, bone, carbonaceous claystone, and, rarely, gray shale or claystone. Within the proposed permit area, the coal beds are the most consistent correlatable stratigraphic horizons.

The stratigraphic thickness of the Puget Group in the Black Diamond area is estimated to be between 6,200 feet (Vine, 1969) and at least 7,000 feet (Mullineaux, 1970), based on measured sections and well records.

The Puget Group is interstratified with and intruded by porphyritic andesite of Late Tertiary age in the form of dikes and sills. Two coal exploration holes encountered andesite intrusions at depth. Hole 60-4, located in the SW¼ of sec. 12, T. 21 N., R. 6 E., intersected interbedded sandstone and igneous rock from a depth of 1,910 feet to 2,070 feet. Hole 60-5, located in the SE¼ of the same section encountered 320 feet of andesite from a depth of 730 feet to 1,050 feet. (For locations of holes 60-4 and 60-5, see figure 3.3.2-1.) No igneous intrusions are known to be present within the coal-bearing rocks to be mined.

Eighteen named coal beds in the Puget Group of commercial importance are present in the Black Diamond portion of the Green River coal district. These beds are, from oldest to youngest, the Franklin Nos. 5 and 6, the Mud Lake, the Franklin Nos. 7, 8, 9, and 10, the 810, the Franklin Nos. 11 and 12 ("Fulton"), Big Dirty, McKay, Skunk Cabbage ("B"), Gem, and the Kummer Nos. 0, 1, 4, and 5 (fig. 3.2-1). The McKay bed is the seam which has been extensively mined by underground methods on and in the vicinity of the proposed mine area (fig. 3.2-2).

The coal beds considered to be potentially surface minable within the proposed permit area are the Big Dirty, Franklin Nos. 12, 10, 9, 8, and 7, listed in descending stratigraphic order. The coal seam outcrops are shown in figure 3.2-2.

Tectonic movements during Early Oligocene to Late Miocene time have deformed the formerly flat-lying Puget Group strata into a series of north-south-trending anticlines and synclines in the Black Diamond area. The principal structural feature of the proposed permit area is the Black Diamond anticline, whose axis trends southwest to northeast across the area (fig. 3.2-3). The Black

436-784 O - 84 - 3 : QL 3

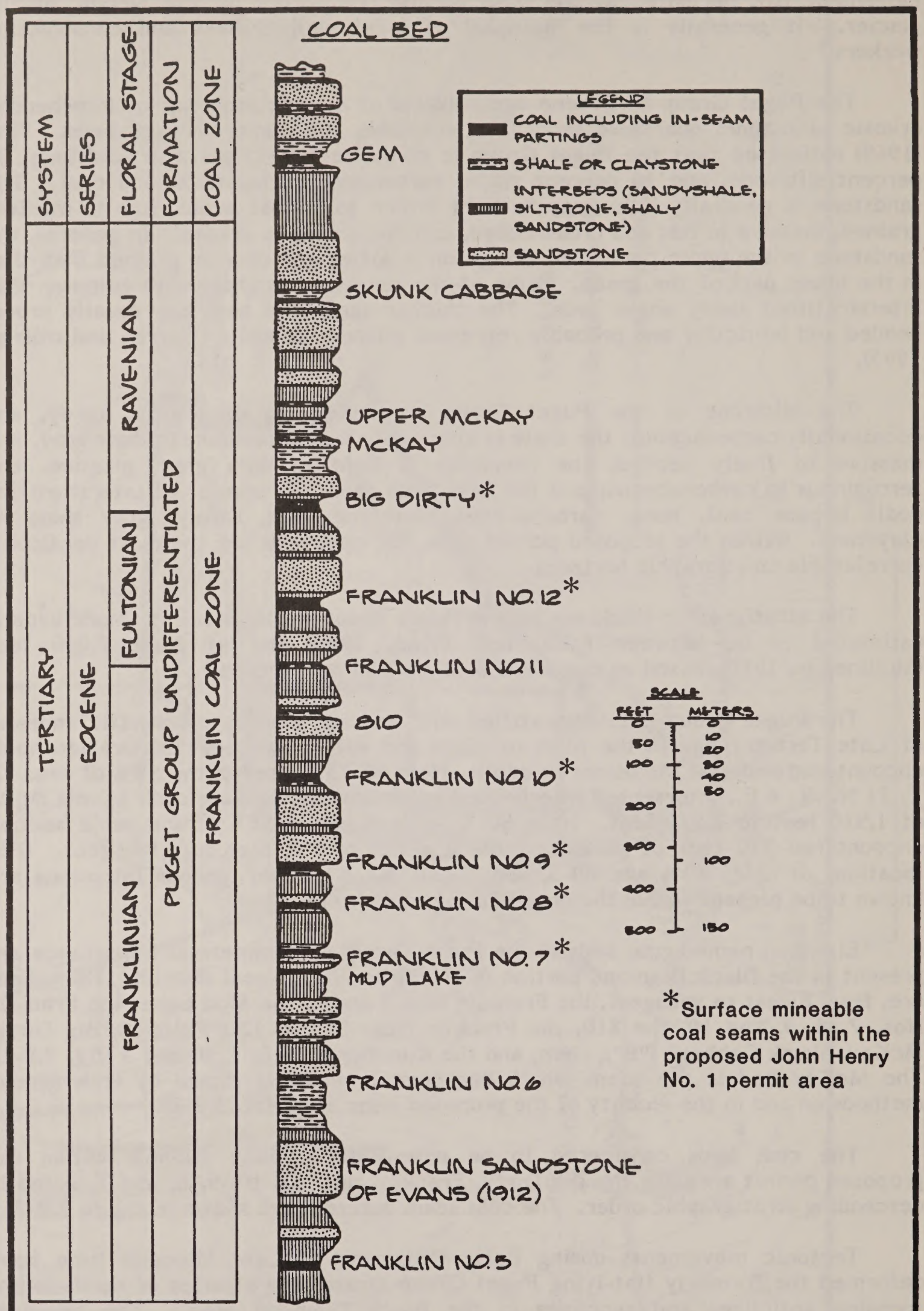


Figure 3.2-1.--Typical stratigraphic section of the Black Diamond anticline (Source: Modified from King County, Washington, 1982).

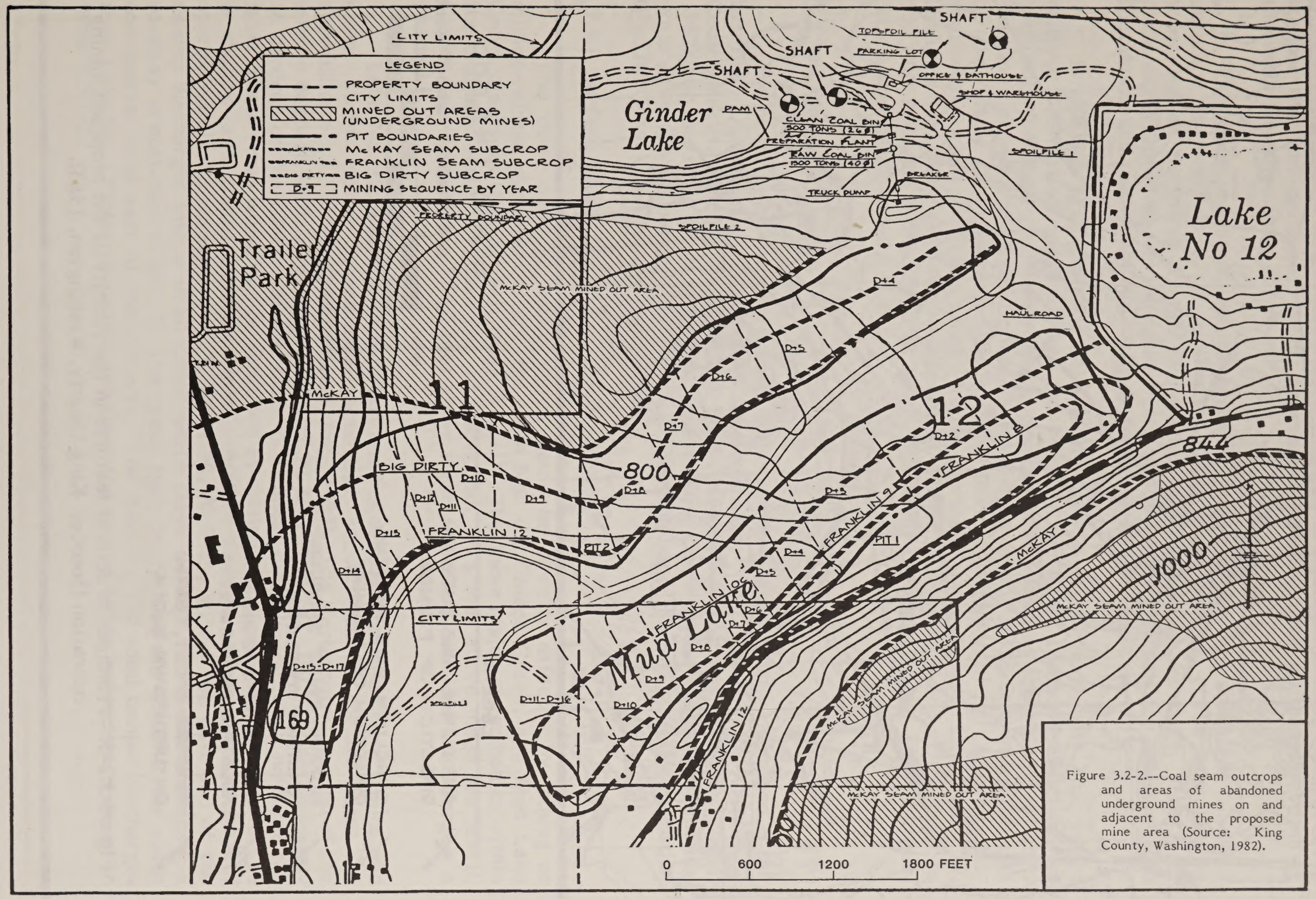


Figure 3.2-2.--Coal seam outcrops and areas of abandoned underground mines on and adjacent to the proposed mine area (Source: King County, Washington, 1982).

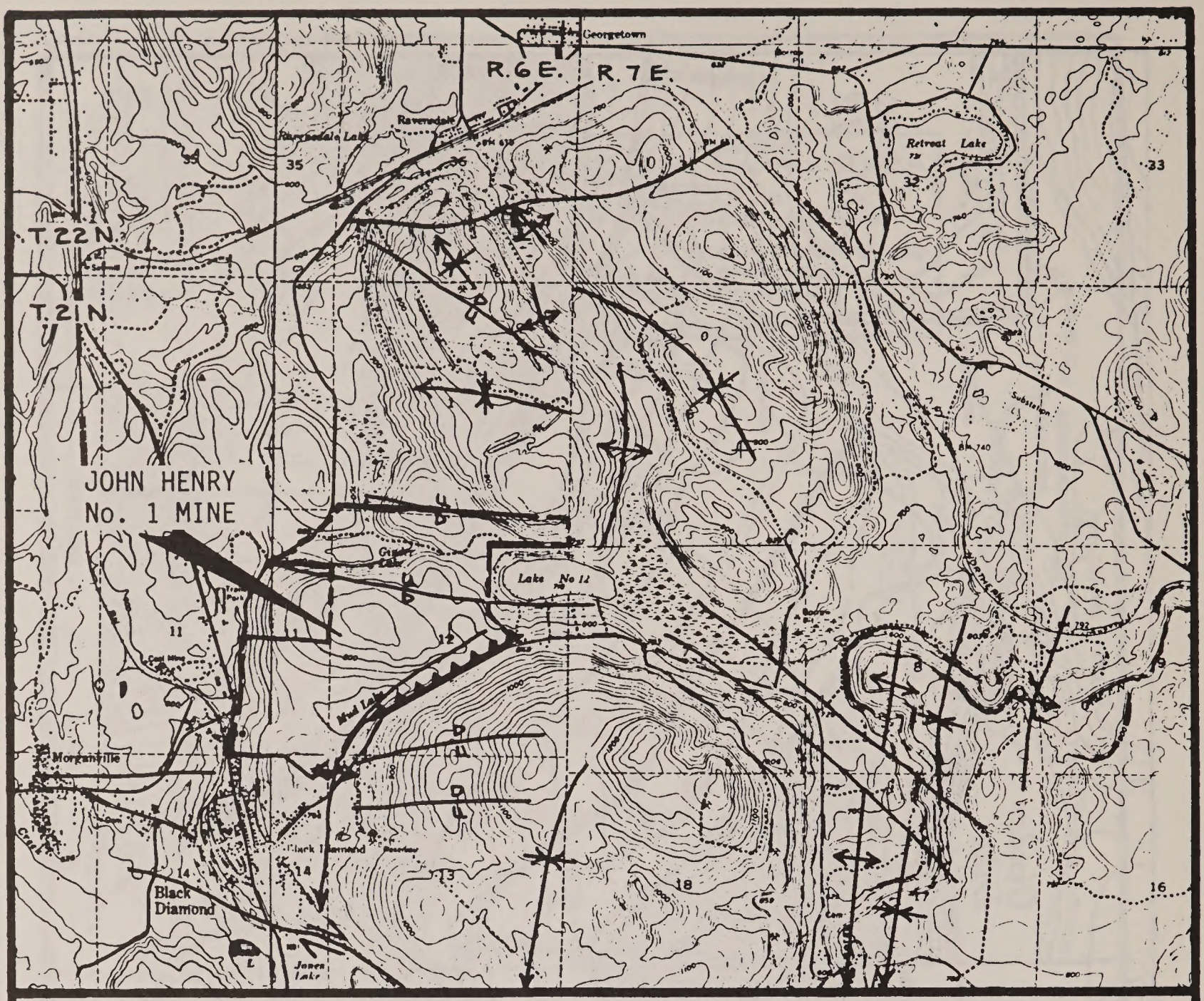


Figure 3.2-3.--Principal structural features in the vicinity of the proposed mining operation (Source: King County, Washington, 1983).

Diamond anticline is an asymmetrical fold with the southeast limb of the fold being steeper than the northwest limb. Dip measurements on the southeastern limb of the anticline range from 45° to 90°.

Within the proposed life-of-mine area, the gross form of the Black Diamond anticline is modified by a number of fault displacements. The anticline is truncated on the north by the east-west-trending Ginder Lake fault. The fault plane dips southward, and the rocks on the south side of the fault are displaced 750 feet downward relative to the rocks on the north side of the fault.

In addition to the Ginder Lake fault, analysis of old mine data and recent drilling information suggests that the crest of the Black Diamond anticline has been deformed by a northwest-dipping reverse fault known as the Mud Lake fault. This fault appears to originate near the southwest end of Mud Lake, where the axis of the Black Diamond anticline rotates from a north-south to a northeast-southwest orientation and then trends northeastward toward Lake No. 12. Displacement along the fault ranges from 0 at the southwestern end of the fault to 550 feet near the intersection of the Green River Gorge Road and 270th Avenue, S.E. (Lake No. 12 Road).

3.3 WATER RESOURCES

The majority of the information in this section was originally contained in the Systems Architects Engineers' Determination of Probable Hydrologic Consequences, Black Diamond Coal Study (Systems Architects, Engineers, Inc., 1982) but has since been presented also in King County's draft and supplemental draft EIS's (King County, Washington, 1982, 1983) and PCCC's permit application (Pacific Coast Coal Company, 1983-84).

3.3.1 Surface Water

The three drainage basins which would be directly affected by mining or mining-related disturbances are the Lake No. 12, Ginder Creek, and Mud Lake Creek drainages (fig. 3.3.1-1; table 3.3.1-1). The three major water bodies within the drainage basins are Lake No. 12 (elevation: 718 feet above mean sea level), Ginder Lake (elevation: 664.5 feet above mean sea level), and Mud Lake (largely a swamp).

Lake No. 12, a lake with vacation and residential sites and where fishing and other water-related recreational activities occur, has a surface area of approximately 42 acres (GeoEngineers, Inc., 1983). The west-central portion of the lake is deepest, with a reported depth of 28 feet (Wolcott, 1973). Approximately 80 percent of the lake's drainage basin is in areas directly south and north of the lake. These areas would not be disturbed by mining. The east end of Lake No. 12 is shallow and abuts and drains into a mature swamp, with a surface area of approximately 98 acres, in sec. 7, T. 21 N., R. 7 E., W.M. The east end of the swamp discharges into a small creek which flows through two culverts beneath a roadway in east-central sec. 7. The creek then drains into the Green River about one-quarter mile east of the culverts. The monthly and total annual discharges from Lake No. 12 into the swamp and from the swamp at the culverts are shown in table 3.3.1-2.

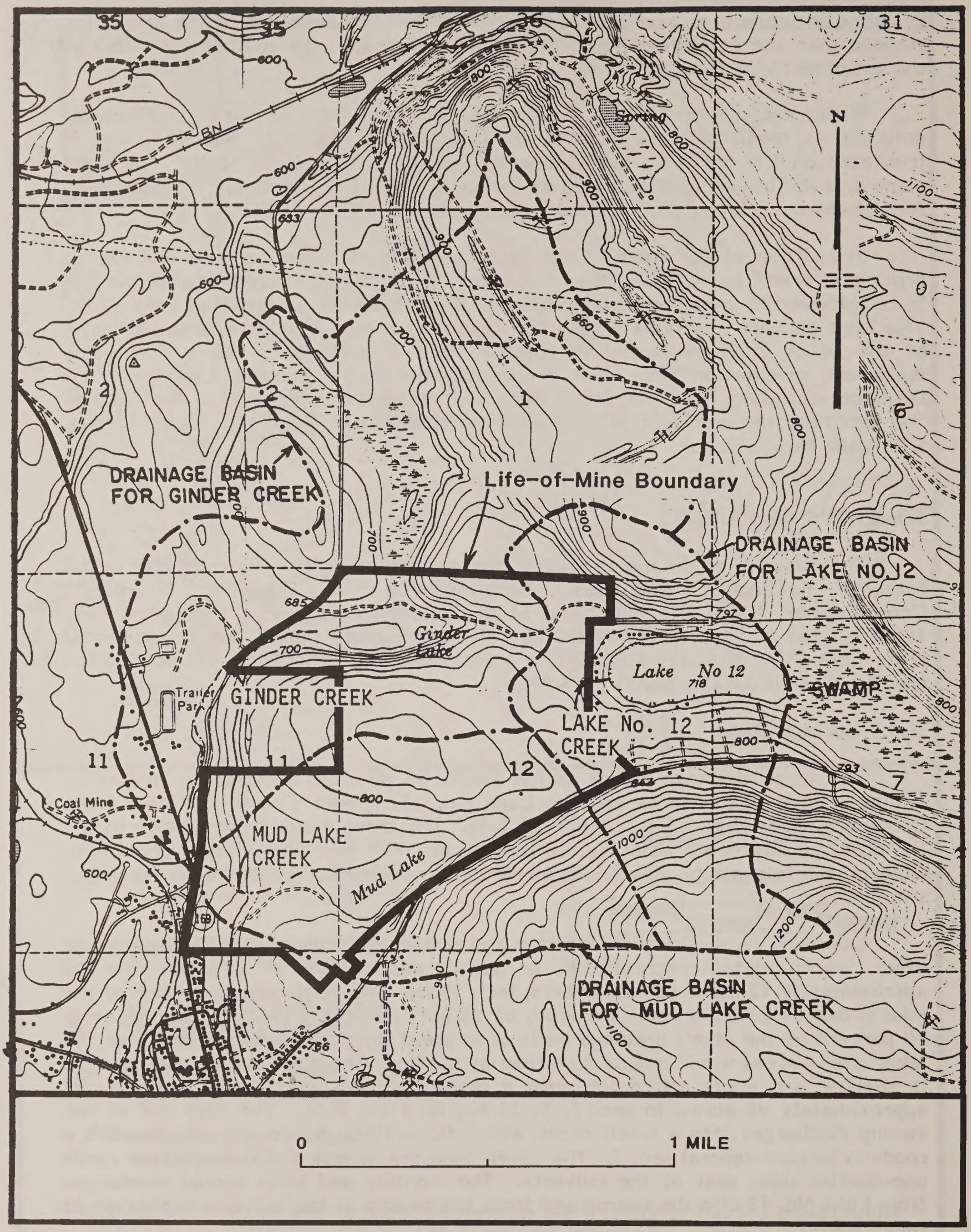


Figure 3.3.1-1.--The three surface water drainage basins that would be affected by the proposed mining operation (Source: King County, Washington, 1983).

Table 3.3.1-1.--Acreages of the three drainage basins, portions of which would be affected by the proposed mine

(Source: Systems Architects, Engineers, Inc., 1982)

Drainage basin	Lake	Land	Marsh	Total
Mud Lake Creek	----	416.0	26.0	442.0
Ginder Creek	6.0	815.0	60.0	881.0
Lake No. 12	41.0	281.0	----	322.0
Total drainage basin area				1,645.0

Table 3.3.1-2.--Discharge from Lake No. 12 and adjacent lake/swamp system

(Source: Systems Architects, Engineers, Inc., 1982. Data are in gallons per minute (gpm))

Portion of year	Average outflow from Lake No. 12 to swamp (gpm)	Average outflow from lake/swamp system (gpm)
December-February	890	2,510
March-May	533	1,450
June-August	102	181
September-November	580	1,610
Annual	526	1,440

The 15.3-acre Ginder Lake (Wolcott, 1973) drains into Ginder Creek, a perennial stream, which flows westward from the proposed mine area through Black Diamond and then into Rock Creek at the southwest corner of Black Diamond. (The Washington Department of Game has designated Rock Creek (downstream from Ginder Creek) as a salmon spawning area.) The water then travels through a wetlands used by Black Diamond as a secondary treatment to remove solids from sewage, and eventually drains into Lake Sawyer about 4.1 miles west of the proposed mine. At the intersection of Ginder Creek and SR 169, Ginder Creek also receives runoff from Mud Lake.

Ginder Lake would be the backup water source for the preparation plant which would use a maximum of 24,000 gallons per day. PCCC has the water rights for 180,000 gallons of water per day from the lake. The two small lakes which were originally located in the area Ginder Lake now occupies were partially destroyed through subsidence of old underground mine workings. The lake as it now exists was formed when Palmer Coking Coal Company dammed the lake in the

1950's to obtain water for their coal washing plant in Black Diamond. The company still utilizes water from the lake during the summer months.

In 1968, Mud Lake was a shallow water reservoir with macrophytic growth in the shallow areas. The extreme east end of the lake merged into a forested stand in areas where surface-water flows fed the lake. Following a major precipitation event, the dam breached, the lake drained, and there was a rapid conversion of the lakebed to a marsh environment. By 1981, the area still retained wetland characteristics, but woody shrubs and trees had colonized large portions of the lakebed.

The three creeks originating in and adjacent to the proposed mining area are Lake No. 12 Creek, Ginder Creek, and Mud Lake Creek. Lake No. 12 Creek originates on the proposed mining area and flows eastward into Lake No. 12; Ginder Creek and Mud Lake Creek originate at the outflow points of Ginder Lake and Mud Lake and flow westward from the proposed mining area. Lake No. 12 Creek and Mud Lake Creek are intermittent streams and are dry during most of the summer. Ginder Creek is a perennial stream. As part of a baseline study, the creeks were monitored (Systems Architects, Engineers, Inc., 1982). Based on U.S. Geological Survey stream gage data, the average flows for these streams were extrapolated based on the size of the drainage areas (fig. 3.3.1-2).

Floodflows for each of the basins were calculated (table 3.3.1-3).

Surface-water quality data for five sampling points on Ginder Lake, Ginder Creek, Mud Lake, and Lake No. 12 are given in appendix C, tables C-1 through C-5. A comparison of NPDES effluent standards applicable to mining operations with the average values from tables C-1 through C-5 for the water-quality parameters are given in table 3.3.1-4. The table shows that the premining surface-water water-quality values within the proposed permit and adjacent areas are below the NPDES requirements which would have to be adhered to by PCCC once mining and related activities commenced. Values for heavy metals and toxic constituents are well below U.S. Environmental Protection Agency standards. The relatively low total suspended solids and flow rates imply that some of the samples were taken under base flow conditions. The results of the analyses reflect the good quality of ground water entering the system.

3.3.2 Ground Water

The major aquifer system in the vicinity of the proposed John Henry No. 1 mine consists of interbedded sandstone, claystone, shale, siltstone, and coal (fig. 3.2-1). Glacial till overlies the bedrock and has very low permeability; the till is not considered an aquifer under OSM's definition because it does not yield enough water for domestic use.

The entire bedrock sequence has been folded and faulted so that the secondary permeability of the aquifer system is greater than interstitial, or primary, permeability. Figure 3.2-3 shows the tight structural control within the mine area. The fracture system in the eastern part of the proposed permit area is probably more uniform than in the western part. Because there are few outcrops, fracture patterns cannot be accurately delineated.

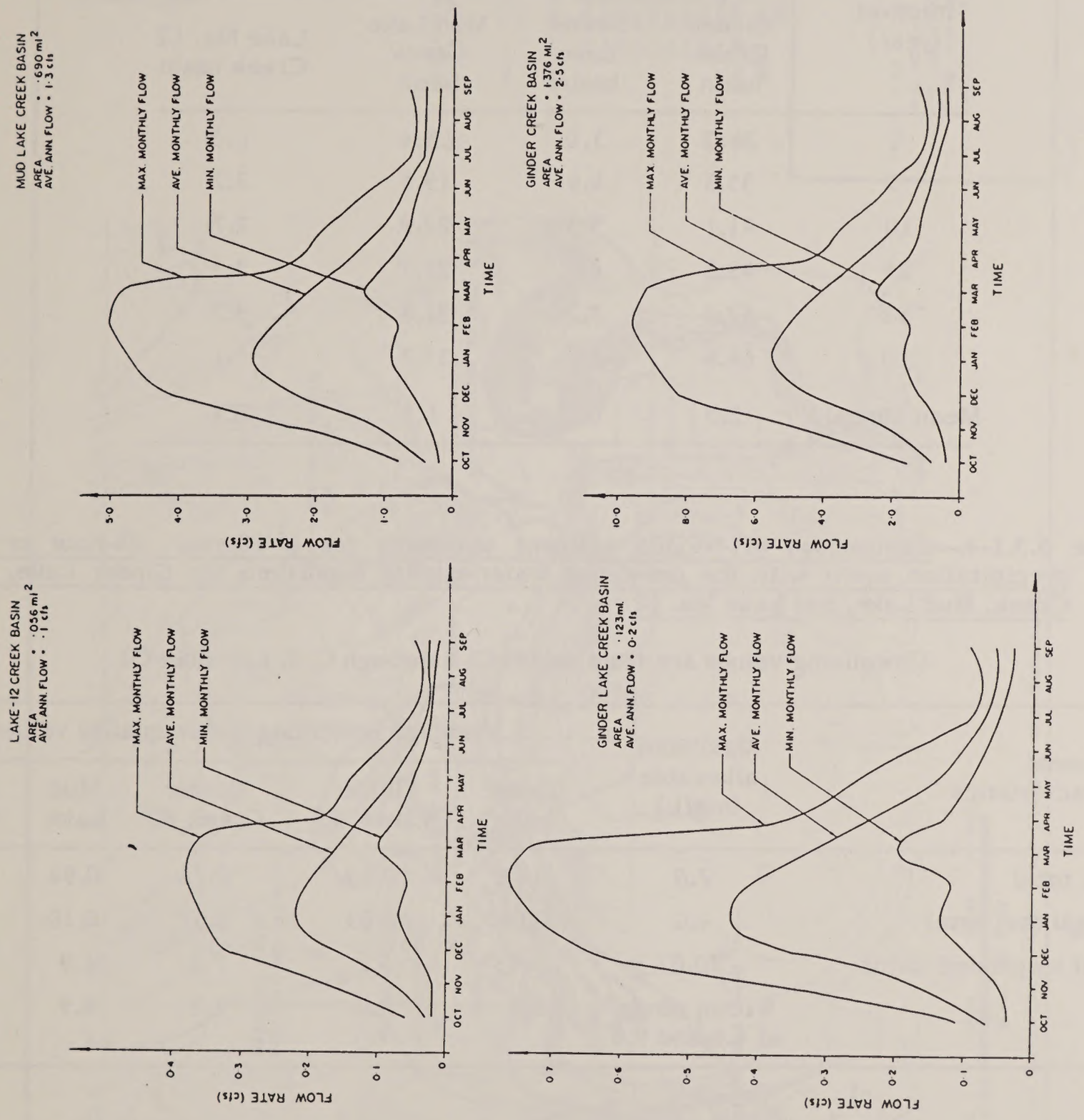

MUD LAKE CREEK BASIN
AREA • ·690 mi²
AVE. ANN. FLOW • 1·3 cfs
MAX. MONTHLY FLOW
AVE. MONTHLY FLOW
MIN. MONTHLY FLOW
FLOW RATE (cfs)
TIME
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
GINDER CREEK BASIN
AREA • 1·376 mi²
AVE. ANN. FLOW • 2·5 cfs
LAKE-12 CREEK BASIN
AREA • ·056 mi²
AVE. ANN. FLOW • ·1 cfs
GINDER LAKE CREEK BASIN
AREA • ·123 mi²
AVE. ANN. FLOW • 0·2 cfs

Figure 3.3.1-2.--Maximum, average, and minimum monthly flows for the basins of Lake No. 12 Creek, Mud Lake Creek, Ginder Lake Creek, and Ginder Creek (Source: Systems Architects, Engineers, Inc., 1982).

Table 3.3.1-3.--Premining floodflows for the basins of Ginder Creek, Ginder Lake, Mud Lake Creek, and Lake No. 12 Creek

(Source: Systems Architects, Engineers, Inc., 1982. Streamflow data are in cubic feet per second (cfs))

Recurrence interval (year)	Streamflow (cfs)			
	Ginder Creek basin	Ginder Lake basin	Mud Lake Creek basin	Lake No. 12 Creek basin
2	24.2	3.0	13.4	1.5
5	35.3	4.4	19.5	2.2
10	41.1	5.3	22.9	2.7
25	49.8	6.4	27.7	3.3
50	57.5	7.2	31.8	3.7
100	64.6	8.1	35.7	4.1
Mean annual	2.5	0.2	1.3	0.1

Table 3.3.1-4.--Comparison of NPDES effluent standards for a 10-year, 24-hour or lesser precipitation event with the premining water-quality conditions for Ginder Lake, Ginder Creek, Mud Lake, and Lake No. 12

(Premining values are from tables C-1 through C-5, appendix C)

Effluent characteristics	Maximum allowable (mg/L)	Average premining water-quality values				
		Ginder Lake	Ginder Creek #1	Ginder Creek #2	Mud Lake	Lake No. 12
Iron, total	7.0	0.42	0.53	0.76	0.94	0.3
Manganese, total	4.0	0.06	0.03	0.07	0.10	0.02
Total suspended soilds	70.0	0.4	5.2	7.2	1.9	7.8
pH	Within range of 6.0 and 9.0	6.7	7.0	7.2	6.9	6.8

There are nine domestic wells located in secs. 11 and 12, T. 21 N., R. 6 E., W.M. (fig. 3.3.2-1). An inventory of eight of the wells is presented in table 3.3.2-1. Water elevations of the Clemens well and eight other test borings are monitored periodically, as shown in table 3.3.2-2.

This information was used to construct a potentiometric surface map for the proposed permit area (fig. 3.3.2-2). The map shows gradients toward the major drainages. OSM may construct a new potentiometric surface map after additional ground-water data under an OSM Small Operator Assistance Program (SOAP)

N

EXPLANATION:

83-2 • **BOREHOLES**

OUTLINE OF PROPOSED OPEN PIT MINE EXACAVATION

DRAINAGE BASIN BOUNDARY

1° CHEATHAM WELL
2° REICHERT WELL
3° CLEMENS WELL
4° BROWN WELL
5° PETERSON WELL
6° PETERSON WELL
7° SMITH WELL
8° MATHEW WELL
9° **BUCKLEY WELL**
83-1 ⊙ MONITOR WELL

NOTE: WATER WELL LOCATIONS ARE APPROXIMATE.

Figure 3.3.2-1.--The location of domestic wells adjacent to the proposed mining area and boreholes on the proposed mining area (Source: King County, Washington, 1983).

Table 3.3.2-1.--Data on eight domestic wells in the area adjacent to the proposed mining area

(Source: Systems Architects, Engineers, Inc. (1982); King County, Washington (1983). Note: All wells are in the rock formation of the Eocene coal-bearing Puget Group except the Clemens well, which is a shallow well in the surficial material. An additional well owned by J. Smith was identified, but the residents declined to provide information)

Owner:	Ray Cheatham	Lee Reichert	James Clemens	Fred Brown	Peterson No. 1[1]	Peterson No. 2	Mathew	Tim Buckley
Date well drilled:	03/11/81	02/04/80	Unavail.	10/06/80	1930's	1963	1960-61	01/30/80
Well depth (ft)	127	240	11	83	12	235	40	240
Well diameter (in.)	4	4	36	6	52	6	36	5
Casing depth (ft)	127	240	11	80	4	180	40	240
Perforation location (ft)	80-120	190-240	---	---	---	All	None	---
Static elevation (ft)	650	756	721	935	---	---	38 W[2] 4-5 S	719
Surface elevation (ft)	700	796	725	975	---	---	---	725
Water-bearing location (ft)	70-127	215-240	11	78-83	---	---	---	240
Yield:								
Bailer rate (gallons per minute)	10	15	28	30	---	---	---	10
Drawdown (ft)	50	160	6.5	15	---	---	---	150
Duration (hours)	2.5	4	0.5	1	---	---	---	1

[1]The Peterson No. 1 well is a backup well.
[2]W = Winter; S = Summer.

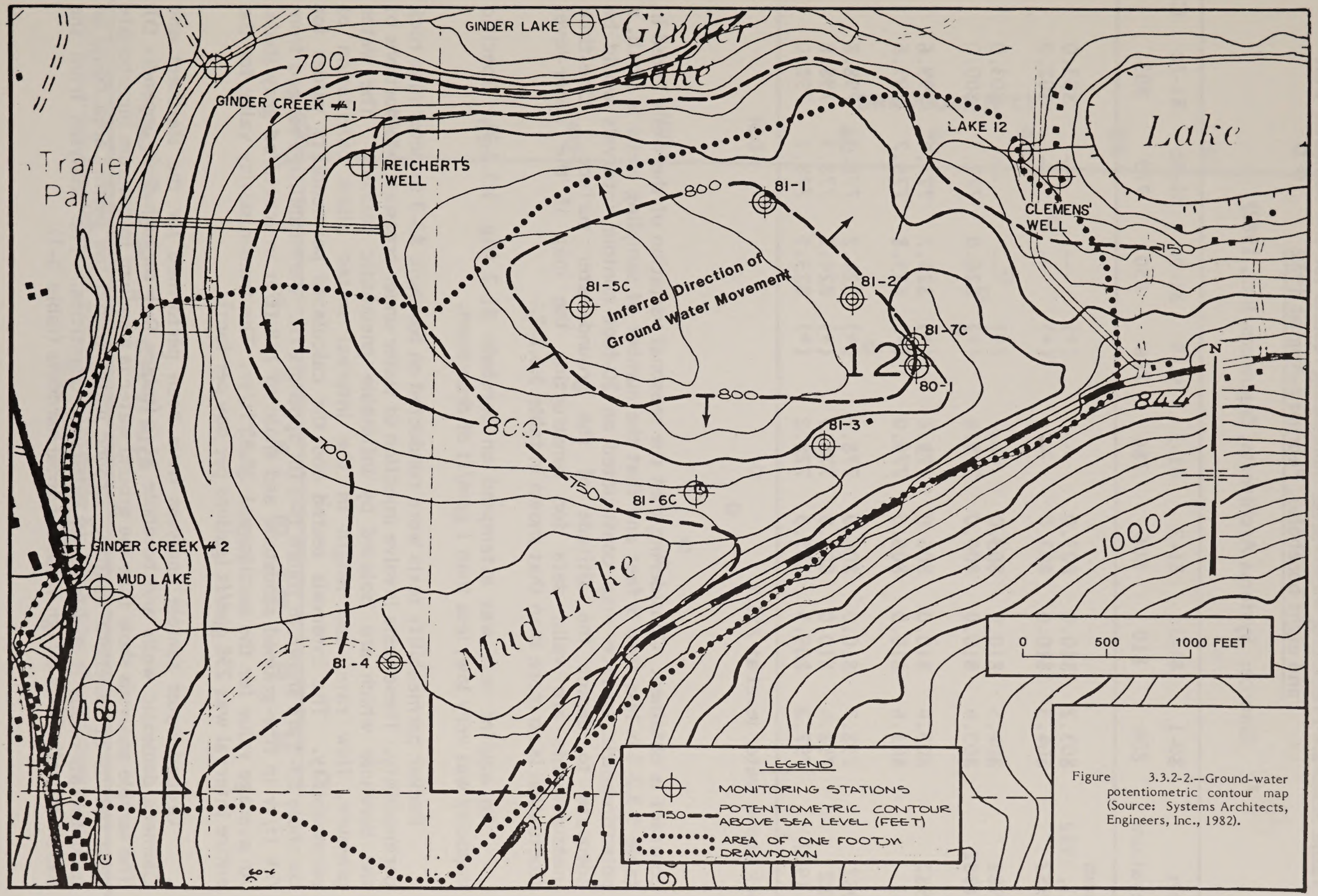


Figure 3.3.2-2.--Ground-water potentiometric contour map (Source: Systems Architects, Engineers, Inc., 1982).

Table 3.3.2-2.--Premining water-level monitoring results for one domestic well and eight boreholes, February-August 1982

(Source: Systems Architects, Engineers, Inc., 1982)

Well number:	80-1	81-1	81-2	81-3	81-4	81-5c	81-6c	81-7c	Clemens
Surface elevation:	806	810	806	786	766	850	779	803	732
Date checked:									
February 23, 1982	803.2	810.0	803.0	---	(*)	---	---	803.0	---
March 3, 1982	804.5	810.0	803.0	---	(*)	---	---	802.0	---
March 4, 1982	804.5	810.0	803.0	---	(*)	---	---	803.0	---
March 10, 1982	803.4	810.0	806.0	779.4	(*)	826.0	777.7	800.0	728.2
April 19, 1982	803.4	810.0	806.0	778.6	(*)	825.7	777.4	799.6	---
May 7, 1982	801.6	810.0	806.0	779.0	(*)	825.8	776.7	799.6	---
June 15, 1982	798.7	810.0	806.0	778.7	(*)	824.2	778.3	798.8	725.0
July 14, 1982	798.4	810.0	805.9	778.5	(*)	824.2	778.3	798.8	---
August 11, 1982	797.2	809.5	805.3	778.2	(*)	823.5	778.1	798.0	---

* Block above water level at 758.9.

contract is obtained. Considering that the seasonal variation of the wells listed in table 3.3.2-2 is less than 9 feet and that the number of sampling wells is small, a potentiometric surface map constructed on 20-foot contour intervals would be adequate to depict the altitude of the ground-water surface. One-time measurements are valid data for constructing the map if the water-level fluctuation is no more than that shown in table 3.3.2-2.

An aquifer test was attempted on borehole 81-2 (fig. 3.3.2-3). Specific capacity was very low, less than 1 gpm/ft of drawdown.

Packer permeability tests were conducted on borehole 83-3 to determine rock permeability. These tests involve injection of water under pressure into portions of the borehole which are isolated by inflatable pneumatic packers. The water pressure, flow rate, and length of the interval tested allow calculation of permeability. The intervals tested and the calculated permeability values for borehole 83-3 are shown in figure D-1 (in appendix D). Permeabilities ranged from 0.4 ft/yr in fine-grained sandstone and shale to 149 ft/yr in fractured gray shale. An average value for the section was 27.35 ft/yr. The transmissivity value for the entire interval was 258 gpd/ft (gallons per day per foot).

Ground-water sample analyses have been performed for the Reichert and Clemens domestic wells and borehole 81-2 (tables D-1 through D-3, appendix D). The sample analyses show that the ground water is a sodium to calcium bicarbonate type that is of excellent quality. Ground water within the permit area could be used for all needs if available in sufficient quantities. The analyses from the Reichert well shows a high value for total hardness (table D-1).

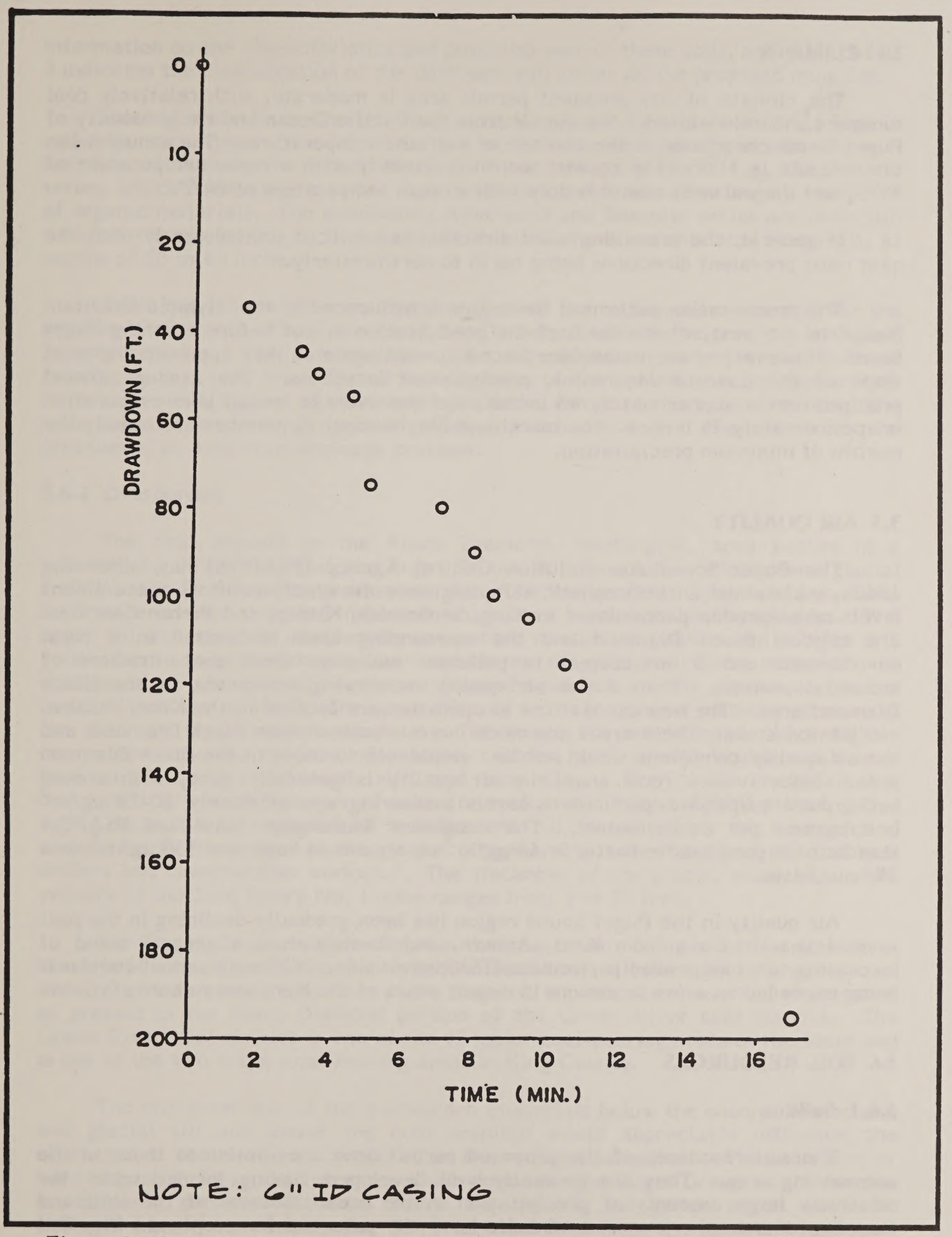


Figure 3.3.2-3.--Pump test results for borehole 81-2 (Source: King County, Washington, 1982).

3.4 CLIMATE

The climate of the proposed permit area is moderate, with relatively cool summers and mild winters. Marine air from the Pacific Ocean and the proximity of Puget Sound contribute to the absence of extreme temperatures. The annual mean temperature is 51°F. The coldest month is January with a mean temperature of 39°F, and the warmest month is July with a mean temperature of 64°F.

In general, the prevailing wind direction is south to southwesterly with the next most prevalent directions being north to northwesterly.

The precipitation pattern of the region is influenced by the Olympic Mountain Range to the west, where much of the precipitation is lost before reaching Puget Sound. However, as air masses are forced upward again as they approach the west slope of the Cascade Mountains, precipitation increases. The average annual precipitation is approximately 45 inches, and the average annual lake evaporation is approximately 24 inches. The months of May through September are usually the months of minimum precipitation.

3.5 AIR QUALITY

The Puget Sound Air Pollution Control Agency (PSAPCA) has, since the 1960's, maintained an atmospheric sampling network which monitors the ambient levels of suspended particulates in King, Snohomish, Kitsap, and Pierce Counties. The city of Black Diamond and the surrounding area is located in a rural environment and is not subject to pollutant emissions from concentrations of industrial sources. There is no air quality monitoring equipment in the Black Diamond area. The nearest stations in operation are located in the Kent, Auburn, and Renton areas. These areas are much more urbanized than Black Diamond, and the air quality conditions would not be comparable to those in the Black Diamond area. Since it is a rural area, the air quality is generally good, with annual background suspended particulate levels measuring approximately 20-25 $\mu g/m^3$ (micrograms per cubic meter). The maximum Washington State and PSAPCA standard for particulate matter is 60 $\mu g/m^3$ on an annual basis and 150 $\mu g/m^3$ on a 24-hour basis.

Air quality in the Puget Sound region has been gradually declining in the past several years. Data from Kent, Auburn, and Renton show a general trend of increasing total suspended particulate (TSP) levels since 1977 with annual standards being exceeded on a few occasions in recent years at the Kent and Auburn stations.

3.6 SOIL RESOURCES

3.6.1 Soils

The soil resources of the proposed permit area are similar to those in the surrounding area. They are generally well developed, having formed under the relatively large amounts of precipitation in the area. Several of the soils and mapping units on the proposed minesite have the potential for cropland. The Soil Conservation Service has determined that the Norma and Seattle series have the characteristics of prime farmland soils, although there has been no history of farming leading to a prime farmland designation. Table 3.6.1-1 provides further

information on the characteristics and potential uses of these soils, and table 3.6.1-2 indicates the classification of the dominant soil series on the proposed minesite.

Most of the soils on the site have a dark-colored A horizon, which is high in soil organic matter. Several of the soil series have well-developed subsoils, or B horizons. However, the subsoil material is not always present; e.g., the Seattle series, which is developing under high moisture conditions and is largely composed of organic materials. The dominating Alderwood and Beausite series are underlain with restrictive layers, such as glacial till, outwash, or consolidated materials, at depths of 20 to 40 inches.

Table 3.6.1-3 provides an interpretation of the reclamation potential for the dominant soil series. The pattern and distribution of soils in the premine landscape is very complex. The potential for toxic microelement concentrations in these existing soils is very low. The surface horizons of the upland soils are moderately to strongly acid, typical of soils developed under coniferous forest vegetation. The soils contain no pyrite or related mineral which could lend themselves to the creation of an acid mine drainage problem.

3.6.2 Overburden

The coal deposit in the Black Diamond, Washington, area occurs in a generally hard rock material, the Puget Group. It is overlain by Pleistocene glacial drift (Vashon Drift) and outwash materials. The Vashon Drift consists of two units. Such materials are unsorted materials which have been deposited by glaciers. The upper till unit consists of a loosely compacted mixture of pebbles and cobbles in a yellow-brown to yellowish-gray sand and clayey silt mixture. These materials are considered an ablation till deposited from the surface of the glacier as the ice melted (Mullineaux, 1965). The upper till unit forms the parent material of most of the soils on the proposed minesite. The lower till unit consists of a tightly compacted unsorted mixture of pebbles, cobbles, and, rarely, boulders, all in a medium-gray matrix of sand, silt, and silty clay. The coarse materials are dominated by rounded pieces of andesite rock. Mullineaux (1965) stated, "This tight, dense till is regarded as a lodgement till, deposited at the base of and compacted by the weight of the glacier. It generally is the 'hard pan' of local well drillers and construction workers." The thickness of the glacial materials in the vicinity of the John Henry No. 1 mine ranges from 1 to 70 feet.

The Puget Group, which contains the coal seams being mined in this area, consists of a thick sequence of interbedded sandstone, siltstone, and numerous coal beds. Eighteen named coal beds in the Puget Group are of commercial importance at present in the Black Diamond portion of the Green River coal district. The Green River coal district is one of the 12 major coal-bearing areas in the State and is one of the two major coal-bearing areas in King County.

The characteristic of the overburden (materials below the unconsolidated soil and glacial till and above the coal seam(s)) would appreciably influence the character of the mine soils produced in the reclamation effort. The indurated or hard nature of the sandstone lenses which dominate the Puget Group would develop a relatively porous substratum below the topsoil, the latter which would be salvaged from the premine soils. The analytical data from the sandstones, as well as from the shale or claystone lithologic units (fig. 3.2-1), provide no indication of the presence of toxic microelements or significant amounts of pyritic or acid-forming materials.

436-784 O - 84 - 4 : QL 3

Table 3.6.1-1.-- Characteristics and potential uses of the soil resources on the proposed John Henry No. 1 minesite

(Sources: Soil Conservation Service, 1973; Soil Conservation Service soil interpretation records (Form 5))

Soil series	Capability unit*	Erosion hazard	Limiting characteristics and suitability	Potential productivity woodland site index**
Alderwood AgC	IV e-2	Slight-moderate	Well and moderately well drained gravelly sandy loams and loams; pasture, timber and urban development; if erosion controlled - well suited to grasses, legumes, small grain and row crops.	3d1 151 ≠ 9.3
Alderwood AgD	VI e-2	Severe	Well and moderately well drained silt loams, gravelly loams, fine sandy loams; primarily used for timber, if cleared - suited to grasses and legumes.	3d1 151 ≠ 9.3
Beausite BeC	IV e-2	Slight-moderate	Well and moderately well drained gravelly sandy loams and loams; pasture, timber and urban development; if erosion controlled - well suited to grasses, legumes, small grain and row crops.	3d2 144 ≠ 5.8
Beausite BeD	VI e-2	Severe	Well and moderately well drained silt loams, gravelly loams, fine sandy loams; primarily used for timber, if cleared - suited to grasses and legumes.	3d1 151 ≠ 9.3
Everett EvC	VI s-1	Slight-moderate	Somewhat and excessively drained gravelly sandy loams and gravelly loamy sands; primarily used for timber, if cleared - moderately well suited to grasses and legumes.	3f3 126 ≠ 10.3

Seattle Sk	11 w-3	Slight	Very poorly drained organic soils, hay and pasture; if drained - well suited to vegetable crops.	None
Norma No	III 2-3	Slight	Poorly drained with seasonal water table; if drained - well suited to corn for silage, grasses and legumes.	3w2 125 ≠ 134

* Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other chracteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

CAPABILITY Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

** Potential productivity (woodland site index) is an indication of the amount of a given woodland crop that a given soil can produce unde a specified level of management. It is expressed as the site index, which is the average height in feet that the dominant trees of a given species will reach, growing on a given soil for a specified number of years. To obtain the average site index for a tree species on a given soil, the average total ages and heights of dominant and codominant trees are determined on a number of soil plots. Site index, based on this height-age relationship, is then determined from formulas or tables developed for this purpose. The site index averages and ranges shown in table 6 are based on the average height of Douglas-fir and codominant trees at 100 years of age.

Table 3.6.1-2.-- Soil series classified according to the current classification system and the revised 1938 system

(Sources: Soil Conservation Service, 1973; Soil Survey staff, 1975; Baldwin and others, 1938)

Series	Current Classification		
	Family	Subgroup	1938 Classification
Alderwood---	Loamy-skeletal, mixed, mesic.	Entic Durochrepts.	Crown Podzolic soils.
Beausite----	Loamy-skeletal, mixes, mesic.	Dystric Xerochrepts.	Lithosols.
Everett-----	Loamy-skeletal, mixes, mesic.	Dystric Xerochrepts.	Brown Podzolic soils.
Norma-------	Coarse-loamy, mizes, non-acid, mesic.	Fluventic Humaquepts.	Wisenboden soils.
Seattle-----	Euic, mesic	Typic Medihemists.	Bog soils.

Table 3.6.1-3.-- Suitabilities of the dominant soil series for use in reclamation of drastically disturbed lands

Soil Series	Limiting Characteristics	SCS Suitability			OSM Suitability
Alderwood	loamy-skeletal: 35% pebbles and stones large fragments of lodgement till at = 30" which is only partially weathered; depth limitation to = 30" - salvaging only Ap, Bw_1 and Bw_2 horizons	Topsoil:	0-15%:	poor-small stones	fair material: to 30" because of stoniness; unsuited below because of combination of coarse materials and induration
			15 + %:	poor-small stones and slope	
Beausite	loamy-skeletal: 35% pebbles and stones C horizon containing 55% gravel limits salvage depths to 22" - salvaging 01, 02, A_1, B_{21}, B_{22}, and B_3 horizons	Topsoil:	0-15%:	poor-small stones	fair material: to 22" because of coarse materials; unsuited below because of extremely high quantities of gravel and sand
			15 + %:	poor-small stones and slope	
Everett	sandy-skeletal: 35% sand and gravel II C horizon which is extremely gravelly sand limits salvage depth to 18" including A, Bw_1 and Bw_2 horizons	Topsoil:	0-15%:	poor-small stones, area reclaim	fair material: to 18" because of coarse material content; unsuited below because of extremely large quantities of gravel and sand
			15 + %:	poor-small stones, area reclaim, slope	
Norma	reduced status of control section which is dominated by the Bg horizon	Topsoil:	poor-wetness		fair material: to 28" because of excess sand content, materials below may be suited but will require on-site studies
Seattle	dominated by sapric and hemic (organic) materials with depths ranging from 40" to 40' strongly acid materials requiring lime for many plant species	Topsoil:	poor-excess humus, wetness		fair material: oxidation of material can cause significant setting or loss in volume - requires mixing in with other materials salvaged for minesoil reconstruction where it becomes extremely valuable
Seattle	same as above except drainage has eliminated engineering problems associated with wetness	Topsoil:	poor-excess humus		

3.7 VEGETATION

The climax vegetation on the proposed minesite is Douglas fir, western hemlock, western red cedar, and, potentially, Sitka spruce. The site was logged during the 1880's for timbers that were used in deep mining operations. The vegetation which dominated the site just prior to the recent clear-cutting was a seral stage of the western hemlock/salmonberry/swordfern community. Prior to the clear-cutting, seven plant communities were identified on the proposed minesite. These community types, which were identified in the Washington Department of Game's floristic inventory (King County, Washington, 1982, appendix 4) include the following:

1. Red Alder-Bigleaf Maple/Salmonberry/Swordfern Community (open)

   This is the dominant community within the proposed mining area. Both the red alder and bigleaf maple are relatively mature; the understory conifers include red cedar and western hemlock; the dominant understory shrub is salmonberry, but associated with this species are vine maple, salal, and Oregon grape. Swordfern dominates the herbaceous layer. In open areas, the vegetation is usually dominated by salmonberry but commonly includes Himalayan, evergreen, and Pacific blackberry.

2. Red Alder-Bigleaf Maple/Salmonberry/Swordfern Community (closed)

   This community type is floristically very similar to the community type discussed above, but due to the closed canopy, there is less development of the understory.

3. Red Alder/Salmonberry/Swordfern Community

   This community is dominated by red alder, which forms a closed canopy; there is little competition from other tree species. Salmonberry generally dominates the shrub layer, but, in places, vine maple becomes an important species. Swordfern dominates the herbaceous layer. Conifers are present in the understory but are small in size. This community type is very common in western Washington.

4. Red Alder-Western Hemlock/Swordfern Community

   Red alder is the dominant tree in this community type, although western hemlock is more numerous. Bigleaf maple is also common. There is very little development of the understory because of the density of the canopy. Elderberry, red huckleberry, bleeding heart, and starflower are present throughout the area.

5. Bigleaf Maple/Salmonberry/Starflower Community

   This community is dominated by bigleaf maple, with western red cedar and red alder as co-dominants. The shrub layer is dominated by salmonberry, with vine maple and elderberry as co-dominants. The herb layer is dominated by starflower, with stinging nettle and violet as associates.

6. Red Alder-Willow/Hardhack Community

This is one of the two wetland communities within the old confines of Mud Lake. The breaching of the Mud Lake dam has resulted in major changes in the flora within this community type. The dominant species within the community is red alder, but willows dominate small portions of the wetter areas. Black cottonwood and western red cedar are subdominants. The principal shrub is Douglas spirea. Various sedges and rushes dominate the herbaceous vegetation.

7. Hardhack/Sedge Community

This is the other of the two communities confined to the old Mud Lake basin. Except for the huckleberries and western red cedars growing on old cedar stumps, the dominants are wetland and flood-tolerant species. The site is drying out rapidly because of the breaching of the Mud Lake dam, and, as a result, major floristic changes are taking place.

Mud Lake is the main wetland within the proposed mining permit area. In 1968, it was a shallow water reservoir with plant growth confined to shallow areas. The extreme east end of the lake merged into a forested stand in that area where surface water flows into the lake. After the dam breached, there was a rapid conversion of the lakebed to a sedge marsh interspersed with distinct channels and some large open water areas in the central, lower areas; hardhack with alder and willow colonized the eastern and western slopes. In the early 1980's, the hardhack and willow dominated a large portion of the west end of the lake; however, the area still retained wetland characteristics, as evidenced by the presence of sedges and channels. Subsequently, the alder, willow, and spirea stands have become denser, but recently their spread has slowed.

3.8 WILDLIFE RESOURCES

The diversity of fish and wildlife species associated with the proposed permit and adjacent areas are indicative of the land use changes that have influenced the habitats. The site is bordered by roads and residential developments, creeks have been dammed, the area has been logged, parts of the site have been previously underground mined, and a corridor of vegetation along the city of Tacoma water pipeline right-of-way has recently been cleared. These factors both explain the mixture of habitats present and affect the fish and wildlife communities adapted to these conditions.

The two predominant habitats present on the site are mixed forest with dense undergrowth and a recent clear-cut, where surviving understory vegetation and invading species flourish. Mud Lake presently covers approximately 26 acres; the dam for this manmade lake failed in late 1971. The area is wet enough to support numerous wetland species. Ginder Lake covers appproximately 15.3 acres and is located in the northwest portion of the site. There are pasturelike areas, quite open and dominated by grasses, and the city of Tacoma water pipeline right-of-way, where shrubs dominate. Other aquatic habitats include a short reach of Ginder Creek and most of Mud Creek, which joins Ginder Creek west of the proposed permit area.

Based on this mixture of habitats, there are 82 bird, 30 mammal, 18 herptile, and 9 fish species associated with the proposed minesite (Washington Department of Game report: appendix 4 of King County, Washington, 1982). A brief discussion of some of the species within these groups follows.

3.8.1 Mammals

Of the larger species, the black-tailed deer, coyote, and black bear are known to utilize the site. These species are wide-ranging and find food in a variety of the habitats. Medium-sized mammal species within the area are raccoon, mink, skunk, lagomorphs, beaver, and muskrat. Several of these species are closely associated with the aquatic and riparian habitats in the area. Numerous small mammals residing on the site are mice, squirrels, shrews, and bats.

3.8.2 Birds

A great variety of bird species, both resident and migrant, are likely to utilize the proposed mining permit area. Likely raptors include sharp-shinned, red-tailed, and Cooper's hawks, the merlin, kestrel, and several owl species. In addition to the wading birds that use the area, the area lies within the migration corridor of numerous waterfowl, some of which may rest or feed in the lakes of the area. A wide variety of passerine species breed and feed in and migrate through the site. The ruffed grouse, an upland game species, is known to reside in the proposed mining permit area.

3.8.3 Herptiles

Amphibians find suitable habitat on the site in the numerous moist and wet areas. Several reptile species, associated with upland and aquatic habitats, are likely to occur on the site. Microhabitats created by downed trees, forest litter, and related cover are important to those species with limited mobility and home ranges.

3.8.4 Fish

Surveys for fish species were conducted both on and adjacent to the proposed permit area. Onsite survey locations included Ginder Lake, Ginder Creek, and Mud Creek; offsite sampling was done in Ginder Creek, Mud Creek, and Lake No. 12. For waters on the site, sculpin were found in Mud Creek near Highway 169, and cutthroat trout were found in Ginder Creek. Ginder Lake surveys produced black crappie, pumpkinseed, and largemouth bass. For offsite areas, Mud Creek at Ginder Creek contained cutthroat trout, and Ginder Creek contained cutthroat trout, sculpin, largemouth bass, coho salmon, pumpkinseed, and lampreys. Lake No. 12 produced cutthroat and rainbow trout, yellow perch, pumpkinseed, and bullheads.

3.8.5 Threatened, Endangered, and Other Sensitive Species

The Endangered Species Office of the U.S. Fish and Wildlife Service has determined that there are no Federal threatened or endangered species on the proposed permit area (appendix E). Among the State of Washington's sensitive species, only the western pond turtle (Clemmys mormorata) is a potential resident.

3.9 LAND USE

The existing and past land uses of the proposed John Henry No. 1 mine and surrounding areas is shown in figure 1.3-5.

The proposed permit area is closed to general public access. Its current land use is managed, second-growth forest lands for timber production and associated wildlife habitat. A city of Tacoma pipeline right-of-way that traverses the southern portion of the permit area was recently cleared of vegetation; however, no construction on the pipeline is scheduled for the immediate future. Timber has been harvested from within the permit area and adjacent areas since the 1880's, and a portion of the permit area was clear-cut during 1982.

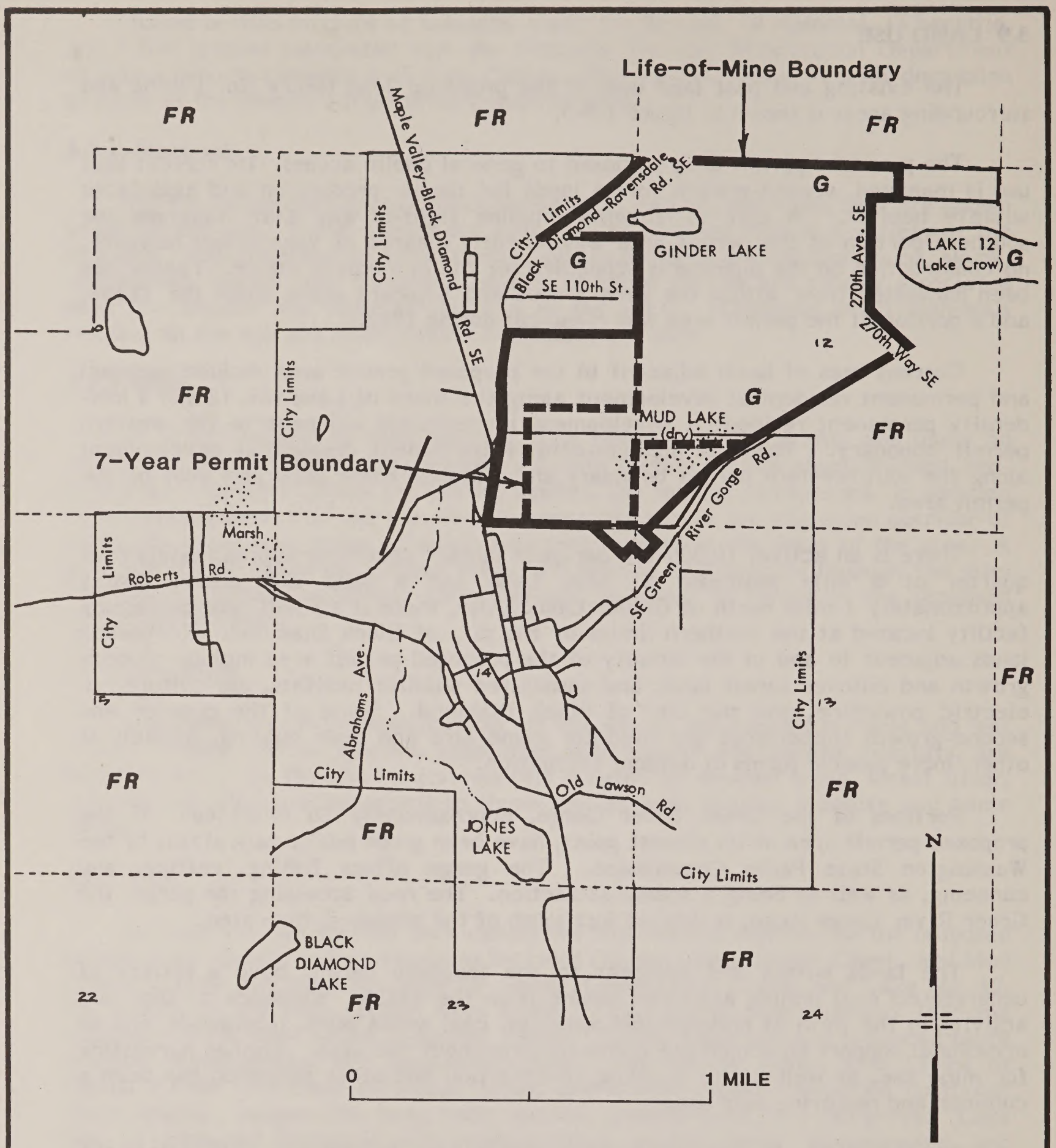
Current uses of lands adjacent to the proposed permit area include seasonal and permanent residential development along the shore of Lake No. 12 and a low-density permanent residential development immediately adjacent to the western permit boundary. There is medium-density permanent residential development along the southwestern permit boundary and a mobile home park just west of the permit area.

There is an active, 10,000-ton-per-year surface coal mine approximately one-quarter of a mile southeast of Mud Lake and a sand and gravel quarry approximately 1 mile north of Ginder Lake. Also, there is a small coal processing facility located at the northern limits of the city of Black Diamond. Remaining lands adjacent to and in the vicinity of the proposed permit area include second-growth and cutover forest lands and associated wildlife habitats, agriculture, an electric powerline, and the city of Black Diamond. Some of the cutover and second-growth timberlands are used for game bird and deer hunting, as well as other, more passive forms of outdoor recreation.

Portions of the Green River Gorge, approximately 1½ miles east of the proposed permit area at its closest point, have been given public park status by the Washington State Parks Commission. The gorge offers fishing, rafting, and canoeing, as well as being a scenic attraction. The road accessing the gorge, the Green River Gorge Road, is located just south of the proposed mine area.

The lands within and adjacent to the proposed permit have a history of underground coal mining activities dating from the 1880's. Evidence of this past activity in the form of underground openings, coal waste piles, subsidence, and an occasional support structure are common throughout the area. Timber harvesting for mine use, as well as for building construction and other purposes, has been a common and recurring land use.

Approximately 20 percent of the proposed life-of-mine area falls within the city limits of Black Diamond and the remainder falls within unincorporated King County (figs. 3.9-1 and 3.9-2). The portion of the proposed life-of-mine area outside the city limits is classified as "Mineral Extraction/Forestry" by the city of Black Diamond and is presently under consideration for annexation by the city; the area is also under consideration for rezoning from a "General" classification to "Quarrying and Mining" by the King County, Washington, Department of Planning and Community Development. The proposed permit area is also included in the King County's proposed Tahoma-Raven Heights Community Plan, anticipated for implementation in early 1984.



LEGEND

G General

FR Forestry & Recreation

Figure 3.9-1.--The location of the proposed John Henry No. 1 life-of-mine area and 7-year permit boundary in relation to the Black Diamond city limits and King County lands zoned for general use and forestry and recreation use (Source: City of Black Diamond, 1982).

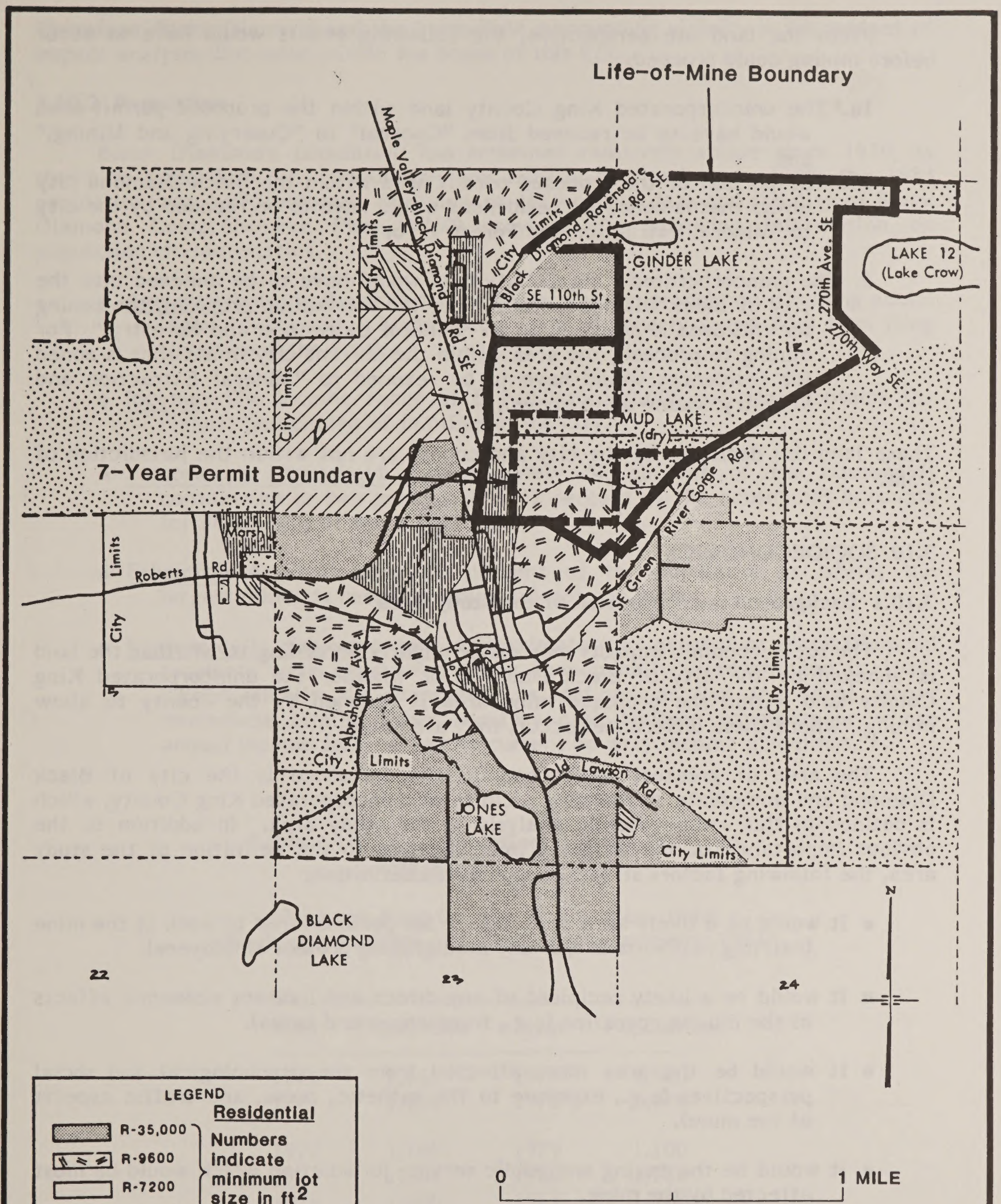


Figure 3.9-2.--The location of the proposed John Henry No. 1 life-of-mine area in relation to the Black Diamond city limits, zoned lands within the city limits, and lands classified by the city outside the city limits (Source: City of Black Diamond, 1982).

From the land use perspective, the following events would have to occur before mining could proceed:

1a. The unincorporated King County land within the proposed permit area would have to be rezoned from "General" to "Quarrying and Mining," and

1b. The portion of the proposed permit area within the Black Diamond city limits that is zoned for residences would have to be rezoned by the city to "Mineral Extraction and Forestry," or

2. The unincorporated King County land would have to be annexed into the city of Black Diamond. As part of the annexation proposal, the zoning for this area is proposed to be "Mineral Extraction and Forestry." For mining to proceed, the area within the current city limits that is zoned for residences would have to be rezoned to "Mineral Extraction and Forestry" (same as 1b above).

These land use decisions by the city and county are not within the jurisdiction of OSM.

3.10 SOCIOECONOMICS

3.10.1 Background and Definition of the Study Area

The socioeconomic impacts may differ slightly according to whether the land is annexed by the city of Black Diamond or whether the unincorporated King County land within the proposed mine area is rezoned by the county to allow mining. Where these differences occur, they are noted.

The area of greatest socioeconomic site influence is the city of Black Diamond and immediate surrounding vicinity of unincorporated King County, which is defined in this socioeconomic analysis as the study area. In addition to the obvious importance of the proposed mine location to the definition of the study area, the following factors strongly support this definition:

- It would be a likely area of residence for persons hired to work at the mine (existing residents and/or any immigrating project employees).

- It would be a likely recipient of any direct and indirect economic effects of the mining operation (e.g., from wages and taxes).

- It would be the area most affected from the psychological and social perspectives (e.g., exposure to the esthetic, noise, and traffic aspects of the mine).

- It would be the taxing and public service jurisdiction which would be most affected by the mine.

- Any mine employees residing in other communities would likely be existing residents. These other communities are larger than Black Diamond, and the few employees or other effects of the operation on these communities would be minimal.

Therefore, Black Diamond and the immediate surrounding vicinity is the subject of impact analysis discussion within the scope of this EIS.

3.10.2 Population

Black Diamond's population has remained relatively stable since 1970, as shown in table 3.10.2-1. Population has slightly declined since 1980; the 1983 population was 1,095 persons. A review of 1980 census data and the city of Black Diamond Comprehensive Plan (1980) provides the following information on population characteristics.

- Age distribution: Black Diamond has a smaller proportion of young adults (aged 15-24) and a higher proportion of elderly (aged 65+) than King County and the State.

- Income: The income range of $15,000 to $20,000 per year contains the highest percentage of families in the city.

- Persons per household: Approximately 52 percent of the households contain one or two persons; this 52 percent of the households accounts for 30 percent of the population.

- Ethnicity: Approximately 97 percent of the population is white; the largest minority resident group is American Indian.

- Economically disadvantaged: Approximately 17 percent of Black Diamond residents were considered to be economically disadvantaged in 1980. ("Economically disadvantaged" is defined as "an individual whose immediate family either receives cash welfare payments or whose annual income falls below the current poverty income guidelines.")

Table 3.10.2-1.--Population of Black Diamond, Washington, 1970-83

(Sources: King County, Washington, 1982; Washington Office of Financial Management, 1983)

Year	Population	Year	Population
1970	1,160	1977	1,080
1971	1,164	1978	1,070
1972	1,164	1979	1,100
1973	1,164	1980	1,180
1974	1,000	1981	1,160
1975	1,000	1982	1,120
1976	1,050	1983	1,095

The population in the adjacent unincorporated areas resides around Lake No. 12 (east of the proposed minesite), and due west of the proposed site on S.E. 310 Street. There are full-time residents and summer residents around Lake No. 12. There are two house trailers on S.E. 310 Street. Population data comparable to the Black Diamond data have not been compiled for those areas of unincorporated King County adjacent to the proposed minesite.

3.10.3 Employment and the Economy

The labor force employed within the Black Diamond area is primarily involved in the recovery of resources (e.g., sand and gravel, timber), heavy construction, and manufacturing. Coal mining plays a very small role in the existing local and regional economies. Residents of the area show a great propensity to travel relatively long distances to work, primarily because of job opportunities in Seattle and its suburbs. Unemployment figures from June 1983 showed unemployment in the Black Diamond area to be approximately 21 percent. The general economic condition in the study area is poor. The city of Black Diamond has stated its desire to establish a stronger economic base and a more self-sufficient community (Pacific Coast Coal Company, 1983-84).

3.10.4 Housing

The Washington Office of Financial Management (1983) reported that the total number of housing units in Black Diamond in 1983 was 449 units, down slightly from 461 units in 1981 and 1982. The 449 units consisted of 347 one-unit structures, 31 two or more unit structures, and 71 mobile homes, trailers, and other structures.

There is one recently vacated housing unit on the proposed minesite; it is owned by PCCC. Other housing in the immediate vicinity is located around Lake No. 12, and the two trailers are due west of the proposed site on S.E. 310 Street.

No up-to-date housing vacancy rates are available for the city of Black Diamond; the 1980 vacancy rate for the city was less than 1 percent (King County, Washington, 1982). The 1983 vacancy rate for Census Tract 316 (which includes the city of Black Diamond and its vicinity) was 2.9 percent, according to the Puget Sound Council of Governments (1983). There has been an increase in single-family units for sale recently in the Lake No. 12 area and within the city limits. The relatively slow sales are a consequence of the depressed economy; in addition, the proposed mining operation has probably further reduced sales of those properties immediately adjacent to the proposed minesite.

3.10.5 Public Services and Infrastructure

The city of Black Diamond provides sewer treatment and water within the city limits. Sewer treatment capacity is currently 1 million gallons per day; current use is only approximately 90,000 gallons per day. The area of the proposed mine facilities and the residences around Lake No. 12 are not within any sewer district. The Black Diamond water-supply capability is approximately 500,000 gallons per day; current use is only approximately 93,000 gallons per day (John Klein, Superintendent, Black Diamond Utility Department, oral communication, October 13, 1983). Owing to the location outside the city limits, no municipal water lines run in the area of the proposed facilities and the residences around Lake No. 12.

Fire protection and emergency medical response is provided by the Black Diamond Fire Department, which is also under contract to provide fire protection to Fire District 17. The entire proposed mining permit area would be within Fire District 17. The fire station is located at Second and Baker Streets, one block west off State Route 169, and approximately 2.3 miles from the proposed minesite. Response to emergency calls is 4 to 6 minutes. The Fire Department has two fire engines, one first aid modulance, and one first aid/rescue vehicle. There are between 25 and 30 volunteers in the Department (no paid personnel), including the Chief and other officers. Average crew sizes are 11 persons for nonworking-hour calls and 8 persons for day working-hour calls. The Chief of the Department has stated that the response system is very antiquated and is barely adequate only because of the relatively few calls received by the department (John J. Bukoskey, Chief, Black Diamond Fire Department, written communication to the King County Building and Land Development Division, January 3, 1983).

Police protection in the study area would be provided by the Black Diamond Police Department within the city limits and by the King County Sheriff's Department in the unincorporated county areas. The City Police Department consists of one chief, four full-time patrol persons, and two reserve patrol persons. The Department has four patrol cars. Response time within the city is approximately 2 minutes. The unincorporated area near the proposed mine is patrolled by the County Sheriff's Department 24 hours per day (King County, Washington, 1982).

School capacity for Black Diamond is 200 students. The present enrollment is 173 (Pacific Coast Coal Company, 1983-84).

Roads in the area are a responsibility of the city, the county, and the State. The road system discussion follows in section 3.10.7, Transportation System.

3.10.6 Fiscal Situation

The Black Diamond budget for 1983 was slightly less than $1 million, a major increase over 1982. This increase was primarily due to the construction and operation of the wastewater treatment system in 1983. Primary tax revenues accrue from property, sales, business, and occupation taxes (approximately 11 percent of total revenues). Intergovernmental revenues (including fire district, library, and Federal revenue sharing) account for approximately 6 percent of revenues. Charges and grants for provision of public services (including water, wastewater, parks and recreation, cemetery, and nutrition services) account for the vast majority of revenues, approximately 73 percent of total city revenues.

Largest expenditures are for the wastewater system construction and operation (approximately 58 percent of total expenditures), the Police Department (approximately 14 percent), water supply system (approximately 5 percent), and city finance and administration (4 percent).

3.10.7 Transportation System

The highway and road system is the primary means of transportation to and within the socioeconomic study area. As mentioned above, responsibility for roads in the study area involves the city of Black Diamond, King County, and the State. State Route 169 is the major north-south arterial to and through Black Diamond. From Renton to Enumclaw, the length of the road is 25 miles. It is a two-lane

roadway. The Black Diamond-Ravensdale Road (directly west of the proposed minesite) is a bituminous surface, two-lane county roadway. Roads are generally in average condition in the area, and analysis of State and county data indicates that there are no major existing traffic congestion problems in the study area. Traffic accidents on State Routes 169 and 516 (Four Corners, north of Black Diamond) have decreased over the 3-year period 1980-82 (Washington Department of Transportation, 1983; King County Traffic Division, 1983).

3.10.8 Social Setting

The city of Black Diamond has a long history of coal mining dating to the founding of the town in the 1880's. While the importance of coal mining has declined since that time, residents in the area today are generally aware of the coal mining history and the existing Palmer Coking Coal Company surface coal mining operation. Many of the elderly residents of the area and long-term residents strongly support growth and development, including coal mining development.

Working-age persons residing in the study area are a mix of relative newcomers and longer term residents. The former include younger professional persons who have moved to the area for its rural, peaceful lifestyle combined with the benefits of living near a major metropolitan area. The latter includes persons employed in timber, sand and gravel, heavy construction, and manufacturing industries. These persons generally would support growth and development, but many also value the rural, peaceful lifestyle of the area. Many other persons in the study area of working age are currently unemployed and would view the mine as a potential source of new employment.

3.11 RECREATION

There are no parks or recreational areas in the proposed mine area. Within the city of Black Diamond there is a 3-acre park adjacent to the Black Diamond Elementary School. It has a basketball court and two tennis courts. The Black Diamond Elementary School has a playground, which is also used by the community for Little League baseball and soccer games.

There are several recreational facilities close to Black Diamond. These include: Lake No. 12 (1 mile east of the city limits and immediately east of the proposed permit area), Wilderness Lake (7 miles north of the city), Lake Sawyer (northeast of the city limits), and Green River Gorge (4 miles east of the center of Black Diamond). To the southeast are Flaming Geyser State Park and Green River Conservancy. Five miles northeast of Black Diamond is the recently opened Kanaskat State Park, which provides overnight camping facilities.

3.12 NOISE

The proposed permit and immediately adjacent area can be considered quiet and is typical of generally undeveloped rural wooded areas. Noise surveys conducted on the site and adjacent areas during both normally quiet and normally busy times of the week (King County, Washington, 1982, 1983) indicate that ambient noise levels are within the noise level ranges considered by the U.S. Housing and Urban Development Authority (HUD) as acceptable for residential

areas. Chain-saw operations, loud radio/stereo players, and vehicular traffic were noted as contributors to noise levels in short-term excess of ambient levels. Table 3.12-1 summarizes the results of the noise surveys and noise monitoring locations in relation to sensitive areas adjacent to the proposed permit area. Figure 3.12-1 depicts non-aircraft noise criteria for residential areas, as determined by HUD.

Table 3.12-1.--Ambient noise levels

(Source: King County, Washington (1982). Values are in decibels (dBA) measured on the A scale)

Location	Normally quiet period	Normally busy period		
		L_{10}	L_{50}	L_{90}
Lake No. 12 (Residences west of lake)	≤30	47	40	≤30
Mud Lake (Residences south of west end of lake)	35 (73)	50	35	≤30
Southwestern corner (Intersection of Highway 169 and Black Diamond-Ravensdale Road)	60 (66)	67	56	45

≤ = Equal to or less than.

( ) = Short-term louder noise, such as passing automobile or truck.

L_{10} = Given noise level. Exceeded 10 percent of the time. Generally represents passing traffic.

L_{50} = Median noise level. Represents observed chain-saw operation and distant drilling activities.

L_{90} = Background noise levels. Exceeded 90 percent of the time.

436-784 O - 84 - 5 : QL 3

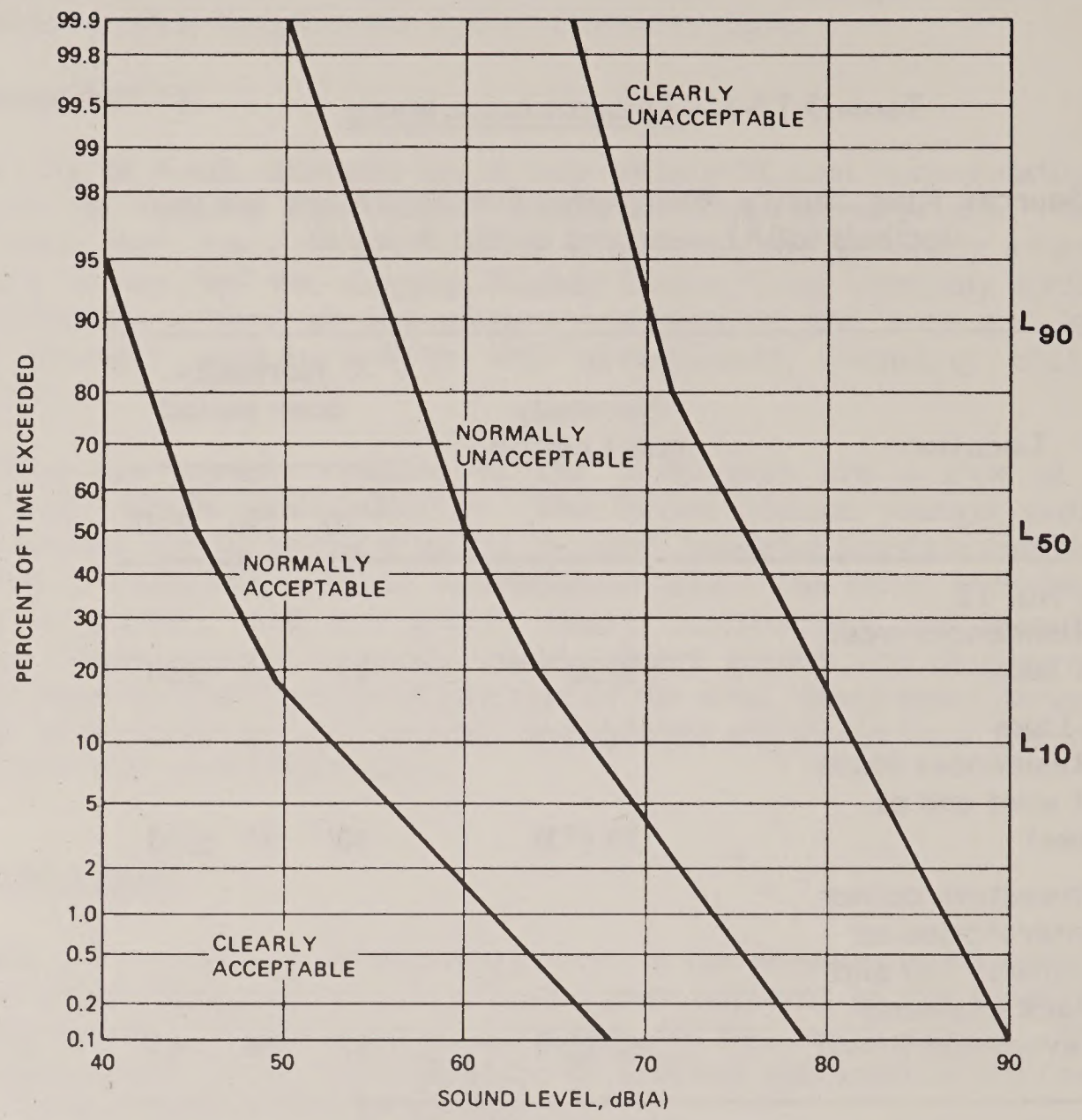


Figure 3.12-1.--HUD criterion for non-aircraft noise in residential areas outdoors (Source: Baranek, 1971).

3.13 VISUAL RESOURCES

The visual resource throughout the general vicinity of the proposed permit area is limited by tall, relatively dense stands of second-growth timber. Panoramic vistas do occur where the screening timber has been thinned or removed and topographic advantage permits overview.

3.14 CULTURAL RESOURCES

An archeological survey of the proposed John Henry No. 1 mine property was conducted in 1983 by Dr. Brian G. Holmes under contract by PCCC (Holmes, 1983). After completion of a literature and site file search, Dr. Holmes surveyed the property, investigating available exposures created by roads, uprooted trees, clear-cutting procedures, and natural erosion. No prehistoric sites were located during the survey, but the presence of previous historic mining activities on the property was noted.

The prehistory of the immediate area is not well understood owing to the lack of archeological inventory. The forest environment places major constraints upon the methods and intensity of survey. A number of prehistoric sites have been located on the Enumclaw Plateau and the Green River area, which lie to the south of the project. However, archeological surveys by Dr. Holmes both in the immediate vicinity of Black Diamond and at the John Henry No. 1 mine have located no prehistoric sites. Dr. Holmes has indicated that sites, if once present, are likely to have been disturbed by sporadic logging in the area. In addition, prehistoric sites would likely have been used only over the short term; therefore, such sites would have been ephemeral.

Coal mining in the Black Diamond area began in earnest in the mid-1880's with areas in the proposed John Henry No. 1 permit area being underground mined by Old Pacific Coast Coal (mine No. 1) and Strain Coal Company (Ginder Lake mine) between 1913 and 1941. Evidence of previous mining includes several underground mine timbered shafts and air vents, with no associated surface remains, and an isolated concrete structure that formerly housed water-pumping equipment. The pump was utilized by a company that tried to reopen earlier underground workings, which had been flooded when mining breached Ginder Lake. The pumping operation was a failure, because water was pumped from the mine back into the lake, thus only recirculating the water, and the mine never reopened.

In the immediate area of the John Henry No. 1 mine is the unofficial "Black Diamond Historical District," which at the present time (prior to a formal historical survey) is an information designation used to indicate the importance of the Black Diamond community to the history of the region and the State. The Union Stump and the Black Diamond Depot in Black Diamond are on the State Register of Historic Places. These and several other properties in town, including the Black Diamond Bakery and the Railway Avenue, may also qualify for nomination to the State Register. Other significant cultural resources, including the Green River Gorge Historic District and the town of Bayne, are located in the general area of the proposed John Henry No. 1 mine. However, none of these sites or areas would be adversely affected by the mine's development.

Based on survey of the literature and a surface inventory of the John Henry No. 1 mine property, there are no significant cultural resources that would be affected by mining operations.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

OSM has not yet made a decision on whether the 32.5-acre, 250-foot-deep lake, as proposed by PCCC, meets the applicable OSM regulations. (See the "Reclamation" section of appendix A for further description of the proposed lake and adjacent wetland.) Therefore, for the purposes of impact analysis in this draft EIS, three mining and reclamation scenarios were developed: (1) the lake as proposed by the applicant in the permit application (about 250 feet deep), (2) a lake, but only as deep as those in surrounding areas (Lake No. 12 is reportedly 30 feet deep at the maximum), and (3) no lake and a return of the area to approximate original contour. These three scenarios are specifically addressed in the following sections on topography and water resources.

Since, from an impact analysis standpoint, the depth of the lake is less important for soil resources, vegetation, wildlife, land use, recreation, and visual resources, the impacts of having a lake or not having a lake are briefly discussed in more general terms in these sections. The alternatives are not analyzed in the sections on geology, climate, air quality, socioeconomics, and noise and vibration because the construction of a lake would not significantly alter the impacts to these resources.

4.1 TOPOGRAPHY

Scenario 1.--Approximately 363 acres of land would be disturbed by the surface coal mining operation during the life of the mine. Impacts on the topography would be moderate. Topographic changes would occur owing to the construction of a 3.9-million-cubic-yard out-of-pit spoil and waste pile (containing about 185,000 cubic yards of waste) that would be over 100 feet higher than the existing topography. The hill that would be created would be located west and within 150 feet of the nearest dwelling on Lake No 12. (For location, see spoil pile 1 in figure A-2, appendix A. Note: Section 30 CFR 947.761.11(e) of the regulations prohibits surface coal mining operations within 300 feet of any occupied dwelling unless the owner consents to a lesser distance. If the appropriate waivers are not obtained, the dimensions of the permanent spoil pile would have to vary from the applicant's proposal and/or spoil that would have been placed in spoil pile 1 would have to be stored in another area.) The 32.5-acre final cut impoundment that would be constructed in Pit 1, in the current location of Mud Lake, would be over 250 feet deep. A 12.5-to 14-acre wetland would be constructed on the east end of the lake.

Scenario 2.--Mining impacts on the topography would be moderate, but less than scenario 1. An approximately 25-foot-high permanent pile that would in total contain about 1.0 million cubic yards of waste from the coal processing plant and excess spoil from Pit 1 would be created in the same location as in scenario 1. A final cut lake in Pit 1, with a maximum depth of about 30 feet, an average depth of 20 feet, and a surface area of 32.5 acres, would be constructed in the present location of Mud Lake. PCCC could construct the 12.5- to 14-acre wetland on the east end of the lake, as proposed in its permit application (scenario 1).

Scenario 3.--Impacts on the topography would be minor; the land surface would be restored to a condition much as it is today. Topographic changes during mining would include the addition of 3.3 million cubic yards of spoil and waste to a temporary spoil pile (probably spoil pile 3 in figure A-2, appendix A). This material would be placed in the final Pit 1 cut upon completion of mining. A permanent 20-foot-high excess spoil and waste pile, in the same location as in scenarios 1 and 2 and containing approximately 0.6 million cubic yards of material, would be constructed since all of the material would not be needed to bring the final Pit 1 cut back to approximate original contour. No lake would be created by the mining, but the land surface configuration necessary for a marsh could be re-created in the current location of Mud Lake.

4.2 GEOLOGY

Overburden and interburden over a 363-acre area would be removed during mining; the mined material would include sandstone, shale, carbonaceous shale, claystone, mudstone, and coal. The bedded material would be replaced by a relatively featureless, partly recompacted mixture.

Mining would remove approximately 5.32 million tons of run-of-mine coal or approximately 1.5 percent of the estimated 354.5 million tons of in-place coal reserves in the Green River mining district (Washington Department of Natural Resources, 1974). Owing to economic constraints caused by the steeply dipping seams, the proposed mine would only recover reserves to a maximum stripping depth of 250 feet.

4.3 WATER RESOURCES

4.3.1 Surface Water

A discussion of the effects of the proposed mine on surface-water quantity follows. The impacts discussed are applicable, except where otherwise noted, to all three mining and reclamation scenarios.

The postmining drainage basins (fig. 4.3.1-1) would not differ significantly in size from the premining drainage basins (fig. 3.3.1-1; table 3.3.1-1). The following changes in the drainage basin areas would occur: Mud Lake Creek, 5 percent increase; Ginder Creek, 1 percent increase; and Lake No. 12, 6 percent decrease. The small changes in the drainage basin boundaries would occur in the area of spoil pile 1. The changes in the boundaries would be the same under any of the three scenarios, owing to the presence of spoil pile 1, which would range in height from 20 feet (scenario 3) to 100 feet (scenario 1).

A lowering of the pool level in Lake No. 12 by a maximum of 0.5 foot during the dry season of June through August would occur, owing to ground-water seepage into the mine pits and the change in the Lake No. 12 drainage basin area due to the implementation of the drainage control plan (Pacific Coast Coal Company, 1983-84). This lowering of the Lake No. 12 water level would occur throughout the 16.2-year life of the mine, and for an additional time period during which the new lake on the mine property would fill up (2.5 to 3 years under scenario 1; less than 1 year under scenario 2). (See section 4.3.2, Ground Water, for further discussion of this impact.) Owing to the lowering of the Lake No. 12 water level, outflow from Lake

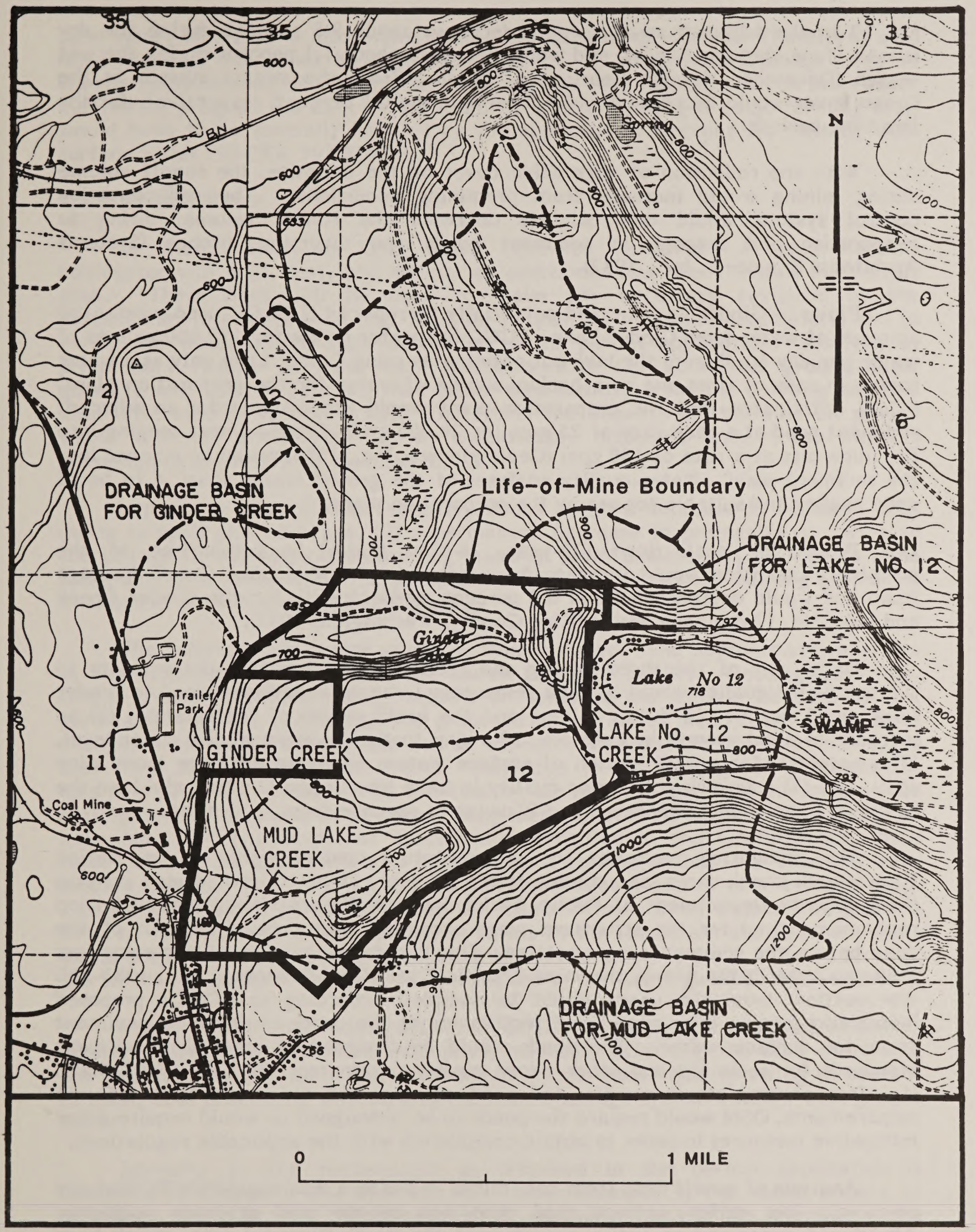


Figure 4.3.1-1.--The three surface-water drainage basins after mining and reclamation (Source: King County, Washington, 1983).

No. 12 to the adjacent swamp would decrease about 9.8 percent during the dry season (June through August) and would decrease about 1.1 percent during the wet season (December through February). Outflow from the swamp system to the Green River would decrease about 5.5 percent and 0.4 percent, respectively for the two time periods.

With the reduction of vegetative cover on the minesite, the runoff volume during mining would increase from premining conditions. The sedimentation control system would only slightly decrease the runoff volume, owing to evaporation and seepage in sediment ponds and diversion ditches (Systems Architects Engineers, Inc., 1982).

Flows in Ginder Creek could potentially be reduced if PCCC used substantial amounts of water from Ginder Lake. PCCC has water rights for 180,000 gallons of water per day (gpd) from the lake but anticipates using Ginder Lake only as a water source in case of fires and as a backup source of water for the preparation plant. PCCC anticipates that the preparation plant would use water from an adjacent sediment pond at a peak rate of 25 gpm, or 24,000 gpd. Ground water seeping into the mine pits at a rate of 180 gpm (GeoEngineers, Inc., 1983) would be pumped into the sediment pond. Water-quality analyses of the ground water show it to be of good quality and suitable for use by the preparation plant.

Postmining peak flows (25-year, 24-hour storm) in comparison to the premining condition would increase 5.1 percent in the Mud Lake Creek drainage basin and would decrease 6.0 and 0.8 percent, respectively, for the Ginder Creek and Lake No. 12 drainage basins (King County, Washington, 1983).

Under any of the three mining and reclamation scenarios, the impacts to surface water quality would be (1) a temporary increase in sediment load to Ginder Lake and Lake No. 12 during mining and the early phases of reclamation, (2) an increase in algal growth in Lake No. 12 owing to the lowering of the water level, (3) a potential for contamination of surface waters owing to drainage from mine spoil, and (4) a lowering of water quality in Lake No. 12 and Ginder Lake (and the new Mud Lake under scenarios 1 and 2) owing to seepage from spoil piles.

The mitigation measures for sedimentation control would be vegetation filters, rock check dams, and ponds. If the 25-year, 24-hour event design criteria (King County Department of Public Works, Surface Waters Management Division recommendation) for the structures were exceeded, water could run out of the pond before the sediments were settled. This has the probability of occurring less than one time in the life of the mine (Pacific Coast Coal Company, Inc., 1983-84). The outflow from the ponds would be sampled according to PCCC's proposed monitoring plan to determine the effectiveness of the ponds in removing sediment from the surface water. The ponds would be designed to meet OSM effluent standards for sediment and other water quality parameters (30 CFR 947.816.42). If, after several storm events, the pond effluent did not meet OSM effluent requirements, OSM would require the ponds to be redesigned or would require other mitigative measures in order to obtain compliance with the applicable regulations.

Analysis of runoff data from coal mines in western Washington shows that the relatively low sulfur content coal does not create acid drainage problems. Abandoned mines and an active operation in the Black Diamond area, which have removed several of the same coal seams as proposed by this operation, have not had acid-mine drainage problems. Preliminary analyses of overburden from the

John Henry No. 1 mine also indicate no potential acid problems. Therefore, acid mine drainage would not be a probable impact. If acid mine drainage were to unexpectedly occur, it should be detected by the applicant's surface-water monitoring program (30 CFR 947.816.52). Any acid-forming or toxic-forming spoil would have to be specially handled by the applicant to prevent its contact with surface water (30 CFR 947.816.48).

4.3.2 Ground Water

By March 1984, an OSM Small Operator Assistance Program (SOAP) contractor will drill, test, and sample an additional four wells within the permit area. These data will be used to make any necessary revisions of the potentiometric surface map (fig. 3.3.2-2), to quantify hydraulic parameters, and to verify the water-quality data submitted in the permit application. Analysis of preliminary results of this study indicates that the additional ground-water quantity and quality data will not differ significantly from the existing baseline data (discussed in section 3.3.2). Therefore, the impacts of the mine on ground water are not anticipated to be considerably different from those impacts presented in the following discussion.

Impacts to ground-water quantity would be (1) a decrease in recharge area owing to spoil pile coverage, (2) a permanent decrease in permeability, owing to the change in the water-transmitting material from undisturbed bedrock to mine spoil, and (3) a lowering of the potentiometric surface, thereby causing drawdown in adjacent domestic wells during mining.

The following discussion concerns item 3 above. The approximate locations of nine adjacent domestic wells are shown in figure 3.3.2-1. GeoEngineers, Inc. (1983) predicted the following impacts to some of the wells. Because of low permeability of the bedrock in the proposed mining area, measurable water-level changes in domestic wells would not be expected at a distance greater than 1,500 feet from the pit excavation limits. Recharge to the Brown well originates in upland areas which would not be affected by the project; therefore, no impacts are anticipated for this well or any other deep wells located directly north or south of Lake No. 12. (Although not specifically identified in the GeoEngineers, Inc., report, this would apparently also apply to the Peterson wells.) The Clemens well, located between Lake No. 12 and the proposed mining pits is only 11 feet deep. This well would only be usable during the winter months when excess precipitation occurs. It is estimated that the water levels in the Cheatham and Reichert wells would drop 5 to 15 feet during the mining and reclamation of Pit 2. The impacts to the Smith and Mathew wells were not analyzed in the GeoEngineers, Inc., report.

Ground-water quality impacts would be (1) a potential for recharge of poorer quality water from reclaimed spoil piles, primarily affecting the area containing the spoil piles, and (2) an overall lowering of ground-water quality owing to contact of spoil, coal processing wastes, and the mine's sewage system outflow with ground water.

Scenario 1.--The reclamation as proposed in the permit application is described in chapter 1 and appendix A. Under scenario 1, the major impact to hydrology would be that the dewatering of the mine pits and the creation of the 250-foot-deep, 32.5-acre lake would lower the water level in Lake No. 12. Inflow into the pits, which would at their nearest point be within 700 feet of Lake No. 12, would be 180 gal/min, of which less than 10 gal/min would be contributed from

Lake No. 12 (GeoEngineers, Inc., 1983). This estimated seepage loss from the lake is small in comparison to the average 102 gpm surface-water outflow from the lake to the adjacent swamp during summer and the average 526 gpm average outflow during winter.

The Ginder Lake fault, which extends southeast from Ginder Lake to several hundred feet south of Lake No. 12 (see fig. 3.2-3 for location) and would be intersected in the extreme northeastern end of Pit 2, would have very little effect on seepage quantities from Lake No. 12 into the mine pits. The fault trace does not pass beneath Lake No. 12, and the fault zone is not believed to be in direct hydraulic connection with the lake. GeoEngineers, Inc. (1983), assumed that the Ginder Lake fault zone is composed of clay or sandy clay gouge, has a 1 foot width, and would have a permeability of 5,700 feet per year (100 times higher than the average permeability of the upper rock zone) with a 5 percent flow gradient. This estimate is greater than expected considering that if the fault has clay gouge along its fault zone, the fault zone would be expected to have a permeability at least as low as the adjoining bedrock. The calculated seepage along the fault was less than 0.4 gpm, which is small in comparison to the ground-water seepage into the pits from Lake No. 12 (less than 10 gpm) and insignificant in comparison to the summer and winter surface-water outflows from the lake (102 gpm and 526 gpm). The ground-water seepage into the pits would cause a drop in the Lake No. 12 pool elevation of a maximum of about 0.5 foot during the summer (Pacific Coast Coal Company, 1983-84). This maximum effect on the lake level is anticipated to occur only during the first few years of mining (Pacific Coast Coal Company, 1983-84). The discharge from Lake No. 12, which currently is into an adjacent swamp, which, in turn, drains into the Green River, would decrease during the life of the mine and until the pool elevation in the new lake rises to its normal postmining level. (For further discussion of this impact, see section 4.3.1, Surface Water.) The new lake would fill up in approximately 2.5 to 3 years (GeoEngineers, Inc., 1983).

Scenario 2.--Reclamation would result in an approximately 32.5-acre lake with a maximum depth of 30 feet. During mining, the water level in Lake No. 12 would be lowered a maximum of 0.5 foot during the summer, as in scenario 1. The new lake would fill more rapidly than it would under scenario 1 (in less than 1 year); therefore, the duration of the effect on the Lake No. 12/swamp system would be less than under scenario 1.

Scenario 3.--Of the three scenarios analyzed, mining under this scenario would have the most minimal effect on the hydrologic balance. The lowering of the water level in Lake No. 12 owing to dewatering of the mine pits would occur as in scenarios 1 and 2. The main unavoidable impact would be the disturbance of the aquifer in the mined-out area. At this time it is not possible to accurately predict the permeability of the material in the reclaimed pits. However, analyses of other coal-mine areas indicate that the permeability of the reclaimed area after saturation would be less than that of the premining aquifer. Since the existing aquifer at the proposed John Henry No. 1 mine has a very low transmissivity, water use should not be affected.

4.3.3 Water Rights

PCCC could use up to 180,000 gallons per day (gal/day) from Ginder Lake, based on water rights owned by Palmer Coking Coal Company which were leased to PCCC as part of the coal mining lease.

PCCC has agreed that if damage occurred to water wells through contamination, diminution, or interruption, the water supplies would be replaced in accordance with Section 30 CFR 947.816.54 of the regulations.

4.4 CLIMATE

The effect of the proposed mining operation on the climate would be insignificant.

4.5 AIR QUALITY

The impact of the John Henry No. 1 mine on the air quality of Black Diamond would primarily be an increase in the total suspended particulates (TSP) and would be constrained to the life of the mine. This impact would be the result of particulate emissions and fugitive dust from haul roads and coal processing. There would be some gaseous emissions from the mining equipment, but the increase in gaseous concentrations would be negligible and within State and Federal standards.

To assess the impacts of the mine on TSP concentrations, mining-related activities occurring during each year of the surface coal mining operation were analyzed for their potential to generate particulate emissions. Using PCCC's permit application, the extent of each activity was determined. Applying Environmental Protection Agency (EPA) emission rates for surface mining operations (Environmental Protection Agency, 1979) and control efficiencies of the proposed air pollution control practices (table 4.5-1), total mining-related emissions were estimated for each year. The highest projected TSP emissions would be 140 tons per year in the eleventh year of mining (table 4.5-2).

Estimates of increases in TSP concentrations for the eleventh year of mining were made using the EPA valley computer model (Environmental Protection Agency, 1977). The maximum predicted annual average TSP concentration off the mine property, including background, is 26 $\mu g/m^3$ (fig. 4.5-1). The maximum predicted increase in 24-hour TSP concentration off the mine property is 22 $\mu g/m^3$. The predicted maximum increase in 24-hour TSP concentrations in the first year of mining (the year when mining is closest to residences on Lake No. 12) is 12 $\mu g/m^3$. The expected increase in concentrations would not exceed the Washington State or Federal TSP annual concentration of 60 $\mu g/m^3$. The potential impacts to the air quality of Black Diamond are considered minor.

A portable high-volume air sampler would be used to monitor the effects of the mining operation on air quality. The sampler would be located to the extent possible downwind from mining activities at the perimeter of the mine boundary.

Table 4.5-1.--Particulate emission factors and control efficiency for selected mining activities

(Source: Environmental Protection Agency (1979). VMT = Vehicle mile travelled)

Emission source	Control technology	Control efficiency (percent)	Emission parameter	Emission factor (lb/parameter)	
				Uncontrolled	Controlled
Drilling - Overburden	Dust collector	99.9	hole	1.5	0.0
Drilling - Coal	None	---	hole	0.22	0.22
Blasting	None	---	blast	50	50
Overburden removal	None	---	yd^3	0.037	0.037
Coal removal	None	---	ton	0.00875	0.00875
Coal dump	Spray nozzles	50.0	ton	0.007	0.0035
Coal crushing	Water sprays	95.0	ton	0.02	0.0010
Conveyors	Enclosure	100.0	ton	0.20	0.0
Clean/stoker coal storage	None	---	ac-hr	2.56	2.56
Clean coal loadout	None	---	ton	0.0002	0.0002
Stoker coal loadout	None	---	ton	0.2	0.2
Transfer station	Partial enclosure	70.0	ton	0.2	0.06
Topsoil storage	None	---	ac-yr	98.0	98.0
Overburden storage	None	---	ac-yr	43.3	43.3
Topsoil/overburden dumping	None	---	ton	0.007	0.007
Road maintenance	Chemical dust suppressant	---	grader hr	32	32
Unpaved roads	Chemical dust suppressant	85.0	VMT	1.77	0.27
Paved roads	Watering	80.0	VMT	0.0134	0.00268

Table 4.5-2.--Summary of controlled particulate emissions from mining-related activities during the eleventh year of the operation

(Source: Pacific Coast Coal Company, Inc., 1983-84)

Activity	Emissions* lb/yr
Topsoil hauling	1,432
Overburden drilling	0
Coal drilling	713
Blasting	7,800
Overburden removal	103,711
Overburden hauling	67,970
Raw coal removal	3,369
Raw coal hauling	5,111
Overburden dumping	23,545
Spoil pile No. 2 wind erosion	1,819
Spoil pile No. 3 wind erosion	1,386
Topsoil dumping	465
Topsoil stockpile wind erosion	1,372
Raw coal dumping	1,348
Raw coal crushing	385
Refuse hauling	1,659
Road maintenance	29,440
Wind erosion clean coal storage	5,606
Clean coal transfer	12,750
Clean coal loadout	44
Clean coal hauling	29
Wind erosion stoker coal storage	2,243
Stoker coal loadout	7,500
Employee vehicles	49
Total emissions	279,746 or approximately 140 tons/yr

* Applying controls.

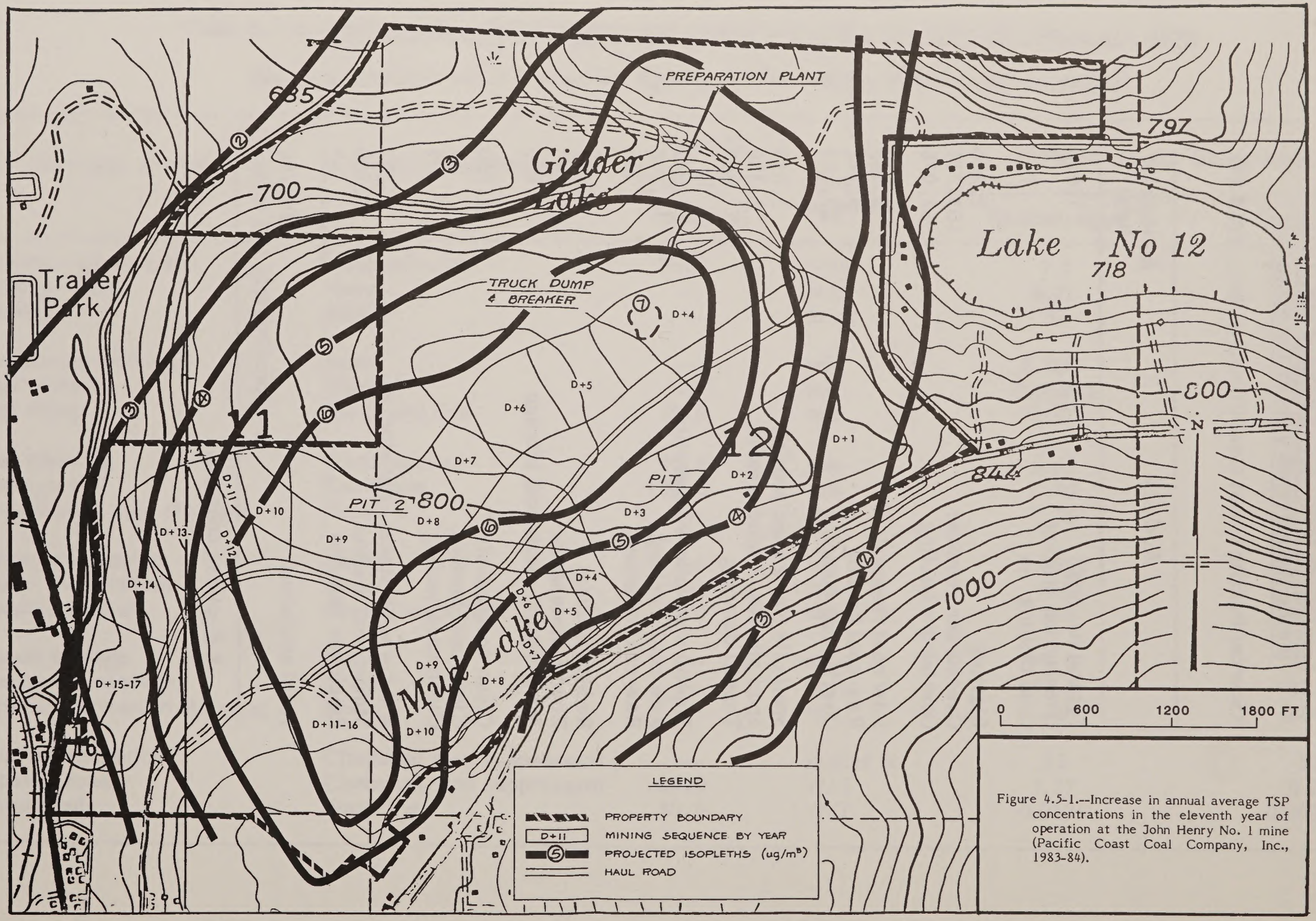


Figure 4.5-1.--Increase in annual average TSP concentrations in the eleventh year of operation at the John Henry No. 1 mine (Pacific Coast Coal Company, Inc., 1983-84).

4.6 SOIL RESOURCES

The soils of the John Henry No. 1 mine would be completely altered during the surface mining process. They have evolved over hundreds or thousands of years and reflect the impact of climate, biological systems, relief, and time on the parent rock or materials of the region. The result has been a large diversity in the soil resource over relatively short distances and the subsequent development of horizons in the soil profile. The Seattle and Norma series, which have evolved under high-moisture conditions, would be the most altered in the mining process.

The reconstructed soils and mine soils would widely differ from the soils found in the premine landscape (table 3.6.1-2). The reconstructed soils and mine soils would be much more uniform across the landscape and in the individual mine soil profile overlying the spoil materials. The topsoil salvage operations would salvage both surface materials (A horizon) and some of the better subsoil materials (B horizon). These materials would be stockpiled and then redistributed as a topsoil or topdressing across the regraded spoils. (Table 3.6.1-3 shows the suitability of the soils for reclamation.) The profile characteristics of the naturally occurring soil change relatively gradually with depth. In the mine soils, however, there would be an abrupt profile change where the topsoil or topdressing material would interface with the underlying spoil material. The physical breakdown of the bedrock material would alter some of the soil moisture relationships now important in the premine environment. Stockpiling the A horizon for any significant length of time would result in deterioration of the biological activities occurring in these materials. As a result, there would be a change in the availability of nutrients in the topsoil of the mine soil.

A second set of impacts on the soil resource would involve the changes that could potentially occur in the uses or capability of the soil resource and its inherent productivity. (Table 3.6.1-1 shows the capability of the existing soil resource.) The Alderwood and Beausite series, which occur on the lower slopes, have the potential for use as small-grain and row crops. Providing adequate drainage is established, the Seattle series is well suited for vegetable crops, and the Norma soils are well suited for producing corn for silage. The most intensive changes would occur in the Norma and Seattle soils, where the potential for truck or vegetable crop production and most row crops would be lost. Most of the soils, including the Alderwood, Beausite, Everett, Seattle, and Norma series, have the premining potential for grasses and legumes. With careful reconstruction of the mine soil and adherence to approximate original contour, this use of the land would be retained. The potential productivity could be equalled for the Alderwood, Beausite, and Everett series, but some losses would occur in the Seattle and Norma soils. PCCC's intended postmine land use for the majority of the mine area is timber production, based primarily on Douglas fir. Conditional upon the careful reconstruction of the soil resource, the capability of the land to support this use would be retained and potential productivities and site indices (table 3.6.1-1) would be achieved.

If OSM were to approve a permanent lake on the mine area (scenarios 1 and 2), a wetland (12.5 to 14 acres under scenario 1) with a minimum of 2 feet of topsoil and peat would be constructed. If the Pit 1 area was backfilled to approximate original contour (scenario 3), a wetland could, but would not necessarily, be constructed. There would be a permanent loss of wetland and wetland soils if it were not reconstructed.

4.7 VEGETATION

A decrease in the diversity of plant communities on the site would occur. This would take place to some extent in the conversion of a naturally revegetating upland site following logging to a replanted Douglas-fir plantation. In this case, the loss of diversity would take place both because of the manipulation of the vegetation and also because of the increased uniformity in the soil resource. The vegetation of the uplands in the premine environment is not unique to this region. The Douglas-fir plantation that is planned could bring the area into greater economic productivity in a relatively short period of time. Under proper forest management, the Douglas fir would reach a height of 110 to 130 feet and a diameter of 18 inches approximately 45 to 55 years after planting (Systems Architects, Engineers, Inc., 1982); at this size they would be marketable for saw timber. The productivity of the Douglas-fir plantation should be equal to or greater than that in the premining condition. A wide range of agronomic and silvicultural tools are available to facilitate the return to productivity levels equal to those of the premine environment.

Mining through Mud Lake, as PCCC proposes, would greatly alter the biological characteristics of the lake and the surrounding wetlands. Vegetation in and surrounding the lake would be destroyed by the mining operation. Depending upon whether the lake is reconstructed, the loss of vegetation associated with the lake and associated wetland would be either long term if a lake and wetland are reconstructed (scenarios 1 and 2), or if only a wetland is reconstructed (an alternative under scenario 3), or permanent if a wetland is not reconstructed when the Pit 1 mining cut is backfilled and contoured (an alternative under scenario 3).

4.8 WILDLIFE

The most noticeable impacts of the mine on wildlife would be the disturbance of existing habitats and the conversion of most habitats to a Douglas-fir forest managed for timber production. Approximately 193 acres would be disturbed to support facilities for the life of the operation, and 170 acres for coal recovery would be disturbed and reclaimed in parcels. The Mud Lake habitat would be disturbed, and PCCC has proposed that the area be reclaimed to a combination lake/shallow-water wetland habitat.

The operation of any surface mine requires facility construction and increased human presence, noise, and traffic. Some species of wildlife are much more adaptable to such disturbances and would be expected to continue to use the site as long as suitable food and cover were present. The increased activities on the site would result in an increased possibility of wildlife/vehicle collisions and disturbance of wildlife during reproductive periods. More specific impacts on the various wildlife communities are discussed below.

4.8.1 Terrestrial Communities

These species would be displaced or destroyed as vegetation and soil were removed. The mobile species, such as birds, black-tailed deer, and coyotes, would be forced to leave disturbed habitats and seek food and shelter where available. Because displaced animals would be forced to compete for resources with animals already occupying adjacent habitats, minor population reductions would occur. These wide-ranging species could periodically use the disturbed sites where food is

available. The less mobile species, some herptiles and small mammals, would suffer direct losses during the land clearing and soil removal phases of the mining operation. Some of these species would continue to use areas around the facilities, taking advantage of artificial shelters provided by buildings, stored equipment, topsoil stockpiles, and other mining-related structures and surface disturbances.

The minesite contains no unique or special habitats crucial to any of the region's terrestrial wildlife. The John Henry No. 1 mine would result in minor reductions of local wildlife populations. However, due to the proposed postmining land use, there would be a long-term loss of habitat diversity for terrestrial wildlife. The present diversity is related to the mixture of habitat types and the various benefits provided by the mixed, unmanaged forest. The cover and structural diversity provides a variety of microclimates, shelters, and foods that attract many wildlife species. The change to Douglas-fir management would emphasize timber production, not habitat diversity. Although there should be fir stands of different ages, competition from invading species and understory vegetation would be discouraged by the relatively close spacing and high density of the overstory Douglas-fir tree plantings, the interplanting of Sitka alder, and herbicides. The replanted areas would provide the greatest benefits during the early stages before the canopy closed and management intensified. Once the forest is dominated by maturing fir trees, the usefulness for many wildlife species would be diminished, especially since the timber management plan does not include features beneficial to wildlife, such as small openings, food plots, and leaving snags or brush piles.

4.8.2 Aquatic Communities

Lake No. 12 would not be physically disturbed, but the drainage control for the mine would reduce the quantity of runoff normally flowing into that lake. This, combined with ground-water outflow from the lake due to mining, would result in slightly lower lake levels but in minimal impacts on the wildlife species associated with the lake. Ginder Lake would not be physically disturbed by the proposed action, but 24,000 gallons of water could be used daily for mine-related activities. (Note: PCCC has water rights for 180,000 gallons of water per day from Ginder Lake. However, PCCC plans to use the lake only as a backup water source for its preparation plant, which at peak use would use 25 gpm or 24,000 gpd. PCCC plans to routinely use water pumped from the mine pits for the preparation plant.) Neither Lake No. 12 nor Ginder Lake's water quality should be significantly reduced, since an approved drainage control plan would minimize sediment loads from disturbed areas, and other water quality changes would be monitored and corrected as necessary.

The infrequent use of a maximum of 24,000 gallons of water per day from Ginder Lake for the preparation plant should result in little change in the flow in Ginder Creek, where salmonids exist and reproduce. If the flow from Ginder Lake were reduced by more frequent or greater than expected water withdrawals, the impact on the aquatic community would depend upon when the reductions occur. If reductions occurred during the spawning period, the suitability of some habitats for spawning would be reduced. If the reduction occurred during the important low-flow period, fish movements could be restricted and some food sources could be adversely affected. In summary, significant flow reductions in Ginder Creek would degrade the habitat and reduce the productivity of the stream's fish community.

436-784 O - 84 - 6 : QL 3

Substantial impacts on aquatic wildlife communities would occur when the Mud Lake habitat was disturbed. The lake would be physically disturbed by the mine operation. Residents of the wetland would be destroyed or displaced during the disturbance and forced to seek habitat elsewhere. This would result in a reduction of the local population of some species and would reduce the suitability of the area for migratory birds. In addition, the hydrologic functions of the wetland, i.e., water storage and sediment control, would at a minimum be disrupted during this disturbance, or be permanently lost if a wetland or lake were not re-created after mining. The impacts to the flow and biota of Mud Lake Creek are not anticipated to be significant.

The Mud Lake habitat, like most wetlands, supports a high diversity of wildlife species. For purposes of an impact analysis, OSM developed three reclamation scenarios. Scenario 1 is PCCC's proposed 250-foot deep, 32.5-acre lake and adjacent 12.5- to 14.0-acre wetland. Scenario 2 includes a lake with a depth consistent with other wetland lakes in the area (about 30 feet deep). Under scenario 3 the Pit 1 area would be backfilled to an approximate original contour condition; there would be no lake, and there may or may not be a wetland, depending upon how the grading and contouring was performed. When constructed in conjunction with a lake (scenarios 1 and 2), the wetlands would likely include such features as water level control, placement of peat for plant growth and water retention, several islands for waterfowl use, and revegetation with selected wetland plants for wildlife food and cover. Successful establishment of these features would produce habitat capable of supporting more wildlife species than the present Mud Lake habitat. If, under scenario 3, no wetland were reconstructed, there would be a permanent loss of wetland habitat on the site.

A lake would enhance the area's suitability for waterfowl and would create additional edge where the shoreline vegetation blends with the upland plant communities. Furthermore, if the mining and reclamation plan, as described in scenario 2, was proposed by PCCC and approved by OSM, the benefits for fish production would be added to those already described. Fish production under scenario 1 would be minimal owing to the configuration of the lake bottom. Most of the lake would consist of nonproductive deep-water areas, and few littoral areas important for spawning, food production, and shelter would exist. Also, the fishery resources could not be effectively managed in the very deep lake that is proposed.

4.8.3 Threatened, Endangered, and Other Sensitive Species

The U.S. Fish and Wildlife Service has indicated there are no Federal listed or proposed endangered and threatened species within the proposed permit area (appendix E).

The only sensitive species listed by the State of Washington for this area is the western pond turtle (Clemmys mormorata). This turtle prefers open water and is only a potential inhabitant of Ginder Lake; if present, it would not be noticeably affected by the proposed mining operation.

4.9 LAND USE

The portion of the proposed mine area outside the Black Diamond city limits is currently zoned as "General" by King County. In order for mining to occur, King County would have to rezone this area to "Quarrying and Mining," or the city would

have to annex the area. The proposed mining area falling within the city limits is zoned for both "Mineral Extraction and Forestry" and residential dwelling uses. For mining to occur, the city would have to rezone the residential areas to "Mineral Extraction and Forestry."

The historic land uses of the proposed mine area have been underground coal mining, farming, logging, and residential. The current land use of the site, managed second-growth timber and associated wildlife habitat, would not generally be changed on the postmining landscape. The timberland would be more intensively managed to the extent that optimum spacing would be observed in planting Douglas fir, and thinning of the stand would occur in later years as needed. There would be long-term loss of habitat diversity for fish and wildlife. The loss would be greatest if OSM decided the applicant's proposed lake did not meet approximate original contour and postmining land use regulations and the entire mined area where Mud Lake now exists was completely backfilled with spoil. The loss would be less if a lake (either the PCCC's proposed lake or an OSM-approved, shallower lake) were constructed in that area.

The city of Tacoma water pipeline right-of-way would be mined through. PCCC has agreed with the city that if the water pipeline were constructed during the life of the mine, the line would be rerouted to avoid the mining operations, with PCCC paying for any extra costs associated with the reroute.

The use of adjacent lands for residences (seasonal and permanent, and mobile homes) would not be changed by mining the proposed permit area. However, the property values for homes adjacent to the site have probably already decreased owing to the proposed mine. These decreased property values would likely continue for the duration of the mining operation. (See section 4.10.9.) The surface owner, Palmer Coking Coal Company, is contemplating selling residential lots on the west end of the proposed lake after mining and reclamation is completed. This area is not scheduled for coal extraction, but an overburden pile would be located on a portion of it during the life of the mine, but not during the 7 years of operation of the initial permit.

There is one residence on the site that has already been vacated. This residence and 11-acre property is owned by PCCC.

4.10 SOCIOECONOMICS

4.10.1 Employment Needs and Sources

Direct employment needs for the proposed project are shown in table 4.10.1-1. These figures include both salaried and hourly workers at the site. The maximum number of employees would be 93 (project years 11-14). PCCC has publicly stated its preference to hire employees from the study area and vicinity for both mining and construction jobs. The permit applicant has recently estimated that local residents would provide approximately 80 percent of total employment needs. This is a reasonable estimate based upon available labor in the area. Therefore, it is estimated that approximately 19 mine employees (project years 11-14) would be immigrants into the area.

Table 4.10.1-1.--Employment needs of the proposed John Henry No. 1 mine

(Source: Pacific Coast Coal Company, Inc., 1983-84)

Year	Employees	
	Mining	Construction
1 (1984)	7	
2	60	20
3-5	65	
6-10	78	
11-14	93	
15-16	66	
17 (2000)	60	
18	45	
19	30	

4.10.2 Induced Employment

Experience has shown that increased basic economic activity would likely lead to a variety of indirect employment opportunities, primarily in the service sector (restaurants, retail stores, etc.). It is difficult to estimate any induced employment opportunities in this situation due to the following factors:

- There is no experience in recent years with a major new development within the study area.
- The study area economy is in such generally poor condition that any economic stimulus may allow existing service sector entities to survive, rather than provide new service sector opportunities.
- The study area is a short distance from Seattle and its suburbs, which provide extensive buying opportunities for the mining employees.

Based on these conditions, it is assumed here that each new mining job would lead to 0.25 to 0.5 new indirect employment opportunities. Table 4.10.2-1 shows the resulting numbers of estimated induced employment. The majority of these jobs would likely be filled by existing residents, the estimated maximum number of immigrants into the study area for induced employment would be nine persons in project years 12-14.

It should be noted that the number of induced employees could in actuality be higher than those projected here, especially in the middle and later years of the project. The most likely reasons for higher induced employment would be if mine

Table 4.10.2-1.--Induced employment estimates

Year	Mine employment	Range of estimated induced employment*
1 (1984)	7	1-2
2	80**	11-22
3	65	18-36
4	65	16-32
5	65	16-32
6	78	18-36
7	78	20-40
8	78	20-40
9	78	20-40
10	78	20-40
11	93	22-43
12	93	23-46
13	93	23-46
14	93	23-46
15	66	20-39
16	66	16-32
17 (2000)	60	15-31
18	45	12-26
19	30	9-18

* Induced employment estimates include a "lag," meaning that all induced employment opportunities would not occur instantaneously. It is assumed that 50 percent of the induced response would occur in the year of basic employment, with the remaining 50 percent occurring in the following year.

** Includes 20 construction workers.

employees show a willingness to spend a large portion of their wages within the study area, and/or if the mine development acts as a stimulus for other basic sector projects to locate in or near the study area.

4.10.3 Employment and Population Effects

Based upon the previous analyses, the number of mine and induced employees projected to be immigrants would rise gradually to a maximum of 28 in project years 12-14 (years 1995 to 1997). Assuming an average household size of 3 persons per employee, the projected population increase in the study area would be 84 persons in the years 1995 to 1997. Based upon the small increases and gradual rise in population, the population effects of the project would not be significant.

The employment opportunities and payroll (near $3 million at full production) would provide a positive economic stimulus and would reduce unemployment in the study area.

4.10.4 Housing

Although the housing vacancy rates in Black Diamond and vicinity are low (1 percent in 1980; 2.9 percent in 1983 for the city and vicinity), little difficulty is anticipated for those persons directly and indirectly employed by the mine in finding housing. Most jobs would be filled by existing residents. Numbers of mine and induced employees who would immigrate into the city would be low, about 28 persons at a maximum in years 12-14 of the mine operation, and there would be a gradual increase to this maximum number. Any housing shortages that could occur by that time could be alleviated by a higher vacancy rate or the construction of additional dwellings. However, if dwellings were not available, some employees could be forced to seek housing in nearby communities. In summary, since the number of in-migrating mine and induced employees would be low, the buildup in employment gradual, and the lead time to alleviate any housing shortages long, no significant impacts to housing are anticipated.

4.10.5 Public Facilities and Services

The facilities for the proposed mine would not fall within any sewer service district; the applicant is designing a disposal system in compliance with County Department of Health guidelines. The mine does not plan to use the Black Diamond water system. Existing city water and sewer systems could easily handle any increased population associated with mine development. If the permit area is annexed into the city of Black Diamond, the mine could tie into the city water system. The Black Diamond water system has excess capacity according the the City Utility Department and would be able to handle the estimated 3,200 gpd of potable water needed for the mine. PCCC has indicated that since this tie-in would be at its expense, it is doubtful that it will be cost effective given the distance from existing water mains.

Due to the small increases and gradual rise in population, impact on education facilities would be minimal and insignificant.

Fire protection at the minesite would be furnished by the operator in accordance with the provisions of Title 30 CFR, Parts 75 and 77, as they pertain to fire protection provisions of the Federal Mine Safety and Health Act (MSHA). The applicant has stated that use of Black Diamond Fire Department capabilities are not planned. However, while MSHA requirements would allow the operator to handle many problems itself, it could be expected that a local fire department could be called under certain circumstances. Additionally, mine facilities would require fire code and other inspections according to State, county, and city requirements and could require the emergency medical response capabilities of the fire department. Therefore, it is clear that the Black Diamond Fire Department would have some jurisdiction over activities and potential problems at the minesite. While its ultimate level of involvement is uncertain, the fire department would have difficulty in responding to any moderate increase in calls or to a major fire at a mine facility under existing conditions. It is likely that additional (paid) personnel and equipment in the fire department would be needed. The role of the

fire department would be the same under either the city annexation or county rezone cases because the entire permit location would be within Fire District No. 17.

The mine would also require additional police responsibilities to be provided by the Black Diamond Police Department (especially in the city annexation case, but also in the county rezone case owing to immigration into the city) or by the King County Sheriff's Department (in the county rezone case). Additional calls could be expected to occur because of crimes (e.g., vandalism, theft), safety concerns (e.g., children near the site), traffic accidents involving mine employees or coal haul trucks, or emergency response in coordination with the fire department at the minesite. As with the fire department, the ultimate level of additional calls for public protection is uncertain; however, the city police department and the county sheriff's department are in positions to handle a moderate increase in calls under existing conditions.

4.10.6 Fiscal Effects

An estimate of direct taxes collected at full mine production by the city, county, State, and other entities under the city annexation and county rezone cases is shown in table 4.10.6-1. Additional sales taxes to the city, county, State, and metropolitan areas would occur as wages were spent on other items within and near the study area.

Major new additional public expenditures resulting from mine development would include fire department needs (the same under either the city annexation or county rezone case), additional traffic, road maintenance, and administrative and regulatory responsibilities (primarily the county's continued responsibility under the county rezone case; primarily the city's new responsibility under the city annexation case). Overall, the city would take on extensive additional responsibilities under the city annexation case, whereas the county would continue most of its existing responsibilities under the county rezone case, perhaps shifting minimal additional resources to the minesite and surrounding area. Therefore, while total additional public tax revenues would be greatest under the city annexation case (with Black Diamond receiving approximately $203,295 of tax revenue compared to $0 under the county rezone case), the additional public sector costs would also be greatest under the city annexation case (with Black Diamond taking the responsibility for regulatory, service, and administrative functions beyond its current level).

4.10.7 Transportation Effects

Information in this section is based on King County, Washington (1982), and updated and modified information provided by Pacific Coast Coal Company (1983-84).

There would be two primary types of potential transportation effects resulting from mine development. These would include the traffic effects of commuting employees and the effects of coal haulage by truck on local and regional roads.

Passenger vehicle traffic increases would occur during weekday morning and evening peak hours as workers commute to and from the minesite. During the years of peak employment (project years 11-14), there would be approximately 80

Table 4.10.6-1.--Estimated annual tax revenues from development of the John Henry No. 1 mine[1]

(Source: Bob Cowan, Director of Finance, King County, Washington, submitted to OSM by Pacific Coast Coal Company. Note: Estimates are for peak coal production years, years 5-16 of the operation)

District/tax	County rezone case	City annexation case
State:		
Sales	$ 812,500	$ 812,500
Business and occupation	60,500	60,500
Real property	(2)	(2)
Personal property	35,298	35,298
Metro:		
Sales	75,000	75,000
County:		
Sales	87,500	13,125
Real property	(1)	(1)
Personal property	15,982	15,982
City:		
Sales	0	111,875
Business and occupation	0	62,500
Utility	0	(3)
Real property	0	2,492
Personal property	0	26,428
Enumclaw Schools:		
Real property	(2)	(2)
Personal property	25,640	25,640
Port:		
Real property	(2)	(2)
Personal property	3,890	3,890
Emergency and medical services:		
Real property	(2)	(2)
Personal property	1,484	1,484
Fire District 17:[4]		
Real property	(2)	-245
Personal property	2,594	0
Rural library:[4]		
Real property	(2)	-561
Personal property	5,951	0
Roads:[4]		
Real property	(2)	-1,397
Personal property	15,176	0
Total (net)	$1,141,515	$1,244,511

[1]All figures indicate net tax change from current situation of no mine.
[2]No change. Assumes land assessed value would continue to be collected at current levels.
[3]No estimate.
[4]King County designation only. These services would be provided through city funds.

additional trips per day along the Black Diamond-Ravensdale Road (which leads to the mine access road). This would increase the current average daily traffic (ADT) on this road by 11.4 percent. Twenty-two of these trips would be made during the first shift (approximately 7 a.m.), increasing the morning peak ADT by 52 percent. Eighteen trips would be made going to the mine for the second shift (4 p.m.). Employees from the first shift would be leaving the mine at that time, resulting in an overall increase of 40 trips during the late-afternoon peak traffic, a 57 percent increase over current conditions. After the second shift, there would be an increase of 18 trips as workers left the site. Carpools are considered in the above analysis and would be encouraged by the company, but there would be no mine-sponsored transportation to and from the site.

Traffic would be expected to increase on other arterials in Black Diamond and in the vicinity of Black Diamond due to worker commuting. This impact cannot be assessed because the specific routes of workers are not yet known. These impacts, plus any traffic increases indirectly associated with mine development, would be slight.

There would be an estimated 33 truckloads of coal leaving the mine each day at peak production. This coal would not be transported during peak hours. Coal would be transported by seven-axle, 75-foot-long highway trucks. The truck empty weight would be 36,000 pounds and maximum gross weight would be 101,000 pounds. Coal haulage would, therefore, be a maximum of 65,000 pounds, or 32.5 tons per truckload. These trucks would not require any special permit or regulatory approval. Truck traffic discussed below is based on 230 days of shipping per year, the number of days of the proposed mine operation per year.

This coal would be shipped to industries and State institutions in the Puget Sound area. Currently, coal is shipped directly by rail to these consumers, or the coal is transported by rail to Kent for distribution by trucks. Therefore, the coal from the proposed mine would be replacing coal that is currently being trucked to consumers. There would be increased truck traffic due to the proposed operation, but only along specific segments of the routes, as discussed below and summarized in table 4.10.7-1.

Table 4.10.7-1.--Increase in coal haul truck traffic

(Source: King County, Washington, 1982; updated and modified information provided by Pacific Coast Coal Company, 1983-84)

Road segment	Approximate number of increased trucks per day
SR 169 (north of Black Diamond to intersection with SR 18)	19
SR 169 (north of intersection with SR 18 to I-405)	11
SR 169 (south of Black Diamond to SR 165)	1
SR 165 (Enumclaw to SR 162)	1
SR 162 (from junction with SR 165 to Orting)	1
SR 18 (from SR 169 to I-5)	8
I-405 (from junction with SR 169 to junction with I-5)	11
Black Diamond-Ravensdale Road	8
Undetermined	5

At full production (project years 6-14), approximately 82,000 tons per year, or 32 percent of the coal mined, would be delivered to the University of Washington and a cement plant in Seattle. The coal would be transported north along State Route 169 (SR 169) to Renton, east on Interstate 405 (I-405) to Interstate 5 (I-5), and north on I-5 to its destinations. This traffic would be approximately 2,520 trucks per year, or an average of 11 trucks per day. Truck traffic would increase by 11 trucks per day only along SR 169 and I-405. The same amount of coal is currently trucked from Kent to Seattle via I-5, so traffic is not expected to increase along this portion of the road system.

Approximately 60,000 tons of coal per year, or 24 percent of production, would be transported to Ravensdale via the Black Diamond-Ravensdale Road, prior to further transport by rail to eastern Washington markets or markets in the Portland area. This would increase truck traffic by approximately 1,850 trucks per year, or approximately 8 trucks per day along this road segment.

Twenty-four percent of the coal mined per year, or 60,000 tons, would be transported to Olympia and Tacoma. The coal would be shipped north on SR 169, south on SR 18, and south on I-5. Approximately 1,850 trucks per year, or 8 trucks per day, would leave the mine on this route. Traffic would only increase along SR 169 and SR 18. Coal is currently being shipped from Kent to these areas.

Twenty percent, or 50,000 tons of coal per year, would be shipped to miscellaneous consumers in western Washington. These would include various State institutions (Orting, Monroe, and Shelton) and various pulp and paper mills. Specific routes for these estimated seven trucks per day are not yet known.

Concerns surrounding the transportation effects discussed above center on four areas:

1. Traffic flows.

2. Deterioration of public roads owing to coal haul trucks.

3. Safety.

4. Psychological impact of coal hauling by truck.

These interrelated concerns are discussed below.

The estimated 80 trips to and from the minesite due to worker commuting plus any incidental passenger vehicle traffic would lead to some additional traffic congestion during the peak periods along the Black Diamond-Ravensdale Road. Current traffic volumes along this road are low enough that this moderate increase would not cause any major problems in traffic flow, with the possible exception of several intersections. These intersections include (1) the mine access road intersection with the Black Diamond-Ravensdale Road, (2) the Black Diamond-Ravensdale Road intersection with SR 169, and (3) the Black Diamond-Ravensdale Road intersection with the Kent-Kangley Road in Ravensdale). Since coal would not be transported from the minesite during peak hours, coal transportation traffic would not further exacerbate flow at these intersections during peak periods. The large coal trucks, however, would present other concerns at these intersections

because of their size and slow speed and acceleration. Improvements to the existing traffic control system could be needed at the intersections noted above for both the passenger vehicle peak and the coal truck nonpeak traffic.

The coal trucks would also present potential problems for road integrity, most notably on the Black Diamond-Ravensdale Road. While the trucks would be in compliance with State weight regulations and not require any special approval or permit, this county road would likely deteriorate over time because of the weight of these trucks. It is likely that improvements would be needed on this road. Although the Black Diamond-Ravensdale Road is a county road, the city has agreed that if the minesite is annexed into Black Diamond, it will take the responsibility for maintenance and improvements to the road (City of Black Diamond, 1980). Under the county rezone case, the county would continue to maintain and improve the road.

Additional traffic and an increase in large trucks on the regional road system would create additional chance for accidents involving passenger vehicles, pedestrians, and bicyclists, which would be an important concern among local residents.

All of the above potential impacts, plus an adverse response to noise and dust associated with this coal truck traffic, would likely cause negative psychological effects on local residents, especially in residential areas.

4.10.8 Social Effects

From the social and psychological perspective, individuals and/or groups would be comparing the economic and employment benefits of mine development with the negative aspects of development, such as additional traffic, noise from machinery and blasting, and coal hauling by trucks on local and regional roads. This comparison would be within the perspective of individual and group values, beliefs, and goals and would vary among the different affected individuals and groups. Because of the existing dichotomy of attitudes and values regarding coal mine development in the study area, the decision of whether to allow mining would greatly affect the perceived social well-being of a large number of individuals and/or groups, no matter what decision is made.

4.10.9 Other Impacts

This section briefly discusses the economic impact of the mining operation on values of homes and lands contiguous to the proposed mining site.

Homeowners and landowners in those areas contiguous to the proposed minesite in unincorporated King County have expressed concern over a decrease in property values attributable to the proximity of the proposed mine development. (Spoil pile 1 is proposed for an area within 150 feet of the nearest residence on Lake No. 12; the Pit 1 and Pit 2 excavations would be located within 450 and 750 feet, respectively, from the nearest dwellings on Lake No. 12.) This perceived drop in value is likely a reality, although it is difficult to determine how much of any recent value decrease is due to the proposed mining operation compared to the local and regional depressed economic conditions and high mortgage interest rates. Further declines in property value are likely for those home and land sites contiguous to the minesite if mining does occur as planned, although values of undeveloped land sites would probably drop less than the sites where houses have

been built. Homes within the city limits have also likely decreased in value recently because of the poor economy. The city has a strong association with coal mining, and any effect of this association on property values within the city is believed to be minimal. Although not anticipated, any major trend in property value decreases because of the reduction in tax base and subsequent drop in property tax revenues would greatly concern the city and county governments.

4.10.10 Issues of Concern and Mitigation Activities

Primary concerns over potential impacts resulting from development of the John Henry No. 1 mine would center on four issues:

1. The capability of the Black Diamond-Ravensdale Road to carry the large coal trucks.

2. The capability of the existing traffic control and management system to handle additional truck and car traffic at affected intersections.

3. The responsibility and capability of the Black Diamond Fire Department to provide fire and emergency medical response at the minesite.

4. Any compensation for landowners or homeowners whose property values and quality of life are adversely affected through mine development.

Decisions on the first two issues would be made by the county and/or city officials. It is possible that major improvements to the road (structure, additional lanes for turning or acceleration/deceleration, etc.) and traffic control system (traffic signals, warning signs, etc.) would be needed as a result of mine development. Additional study may be necessary before decisions on necessary improvements, if any, are made. Whether the permit applicant would be required or expected by the county or city to pay for these major improvements has not been determined.

The Black Diamond Fire Department's concern over its responsibilities and capabilities would likely require negotiation between the applicant, fire department, and city and county officials. Resolution of the issue would require a clear definition of the specific role of the fire department, whether additional personnel and equipment would be needed to carry out this role, and which parties would pay for any necessary personnel and equipment.

There appears to be no legal requirement for any compensation to affected landowners or homeowners contiguous to the proposed minesite.

4.11 RECREATION

None of the existing parks and recreational areas in the surrounding area would be adversely affected by the proposed surface coal mining operation. Use of the recreation facilities would likely increase slightly owing to use by mine and induced employees and their families.

PCCC has stated it would donate a 5-acre strip of land and the permanent postmining lake (if allowed by OSM) to Black Diamond for use as a park. The park is proposed for an area (fig. A-4) just north of the Green River Gorge Road. There

are safety problems associated with the applicant's proposed lake if swimming were allowed in the park. The slope of the lake bottom would be moderately steep, about 3h:1v. Given this slope, the water would be over the head of a 4-foot-tall child about 12 feet from the shoreline. Also, the depth of the lake could have a psychological impact on parents with children who could use the lake for recreational purposes. It is doubtful most parents would knowingly allow their children to swim or boat on a 250-foot-deep lake.

4.12 NOISE AND VIBRATION

Noise levels associated with mining activities and ground vibrations from blasting attenuate with distance. They are expected to be perceptible but not significant outside the proposed mining area.

Noise from surface mining operations is generally associated with drilling, blasting, overburden removal, coal loading, transportation, and coal processing. All these activities are conducted using mechanized equipment, and all the activities produce noise. The intensity of this noise is dependent upon the source and the distance to the receptor.

King County Noise Ordinance No. 3139 and Washington Administrative Code, Chapter 173-60, require that the basic permissible sound level during daytime hours of operation be less than 57 dBA at the receiving rural residences in unincorporated King County (including those residences around Lake No. 12 and the Diamond Ridge Acres subdivision) and less than 60 dBA for the offsite residential properties in Black Diamond. The permissible sound levels drop to 47 dBA and 50dBA, respectively, after 10 p.m. and would therefore be applicable for the 10 p.m. to 12:30 a.m. time period of the second work shift. These levels may only be exceeded by 5, 10, or 15 dBA for total durations not exceeding 15, 5, or 1.5 minutes per hour, respectively. To comply with these regulations, PCCC would use a combination of earth berm sound barriers and setbacks from residential properties around Lake No. 12, along the Green River Gorge Road, north of the intersections of Highway 169 and Green River Gorge Road, the Diamond Ridge Acres subdivision, and properties in Black Diamond between Highway 169 and the Black Diamond-Ravensdale Road (fig. 4.12-1). The earth berms would be constructed 20 or 25 feet high and at distances varying from 100 to 850 feet from the receivers of the sound (Towne, Richards, and Chaudiere, Inc., 1983). The height of earth berms immediately adjacent to spoil pile 1, 2, and 3 would be added to as the height of the spoil piles increased.

Comparison of projected worst case sound levels (table 4.12-1) with the premining condition (table 3.12-1) shows a considerable increase in noise for the residences adjacent to the site. Sound level intensities on this order of magnitude are noticeable but not harmful to humans and animals and are below those levels which usually cause humans and animals to be startled (80 to 100 dBA).

When explosives are detonated in rock overburden, there occurs permanent deformation and fragmentation of the material in the immediate vicinity of the blast hole. This is usually not more than 10 blast-hole diameters from the blast center. From that point, the blast effect is in the form of a seismic wave which radiates away from the site of the blast. The seismic wave decays with distance, and its intensity is directly related to the amount of explosives detonated per delay period.

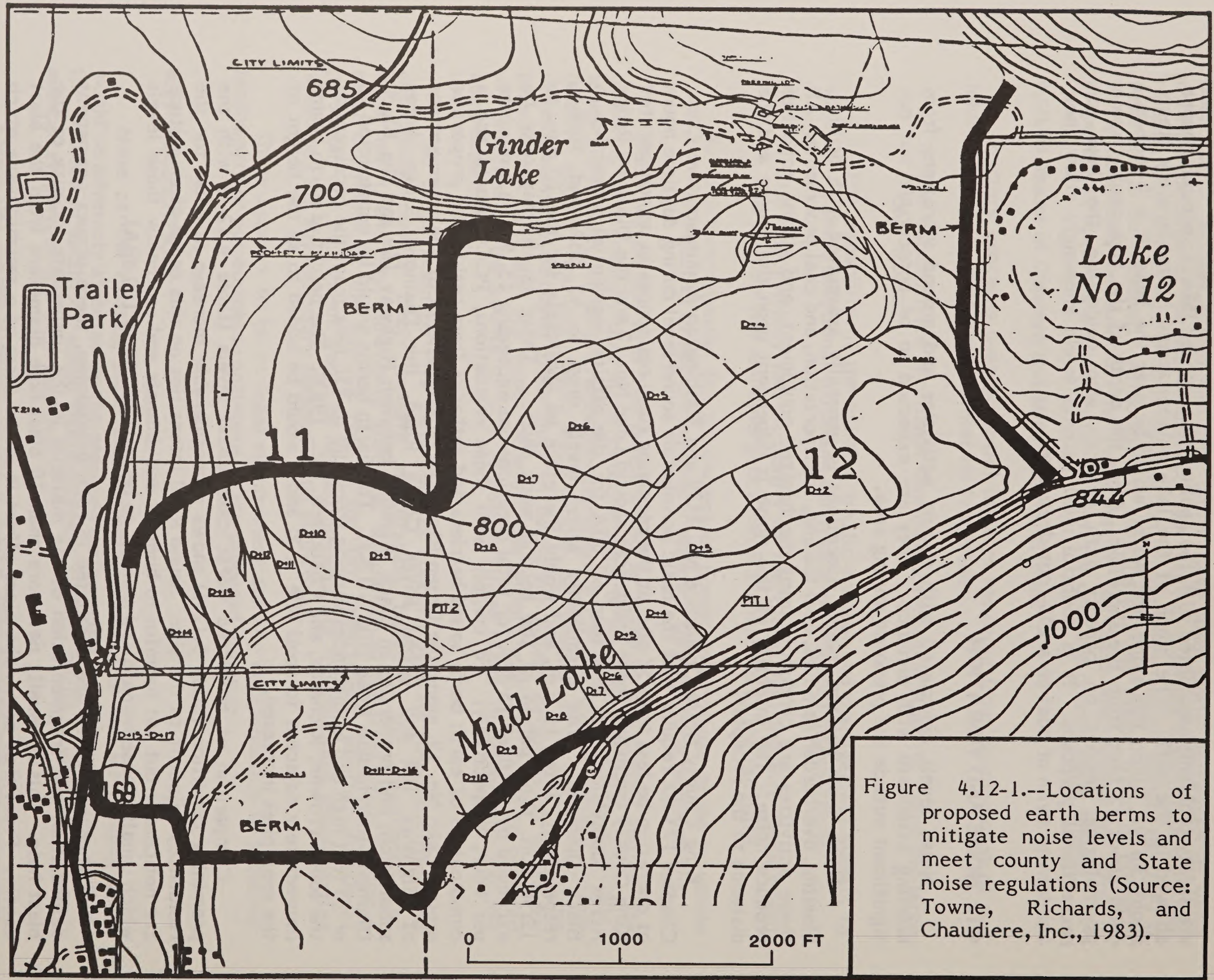


Figure 4.12-1.--Locations of proposed earth berms to mitigate noise levels and meet county and State noise regulations (Source: Towne, Richards, and Chaudiere, Inc., 1983).

Table 4.12-1.--Sound mitigation measures and projected worst-case sound levels at receiving residential properties

Property description No.[1]	Property receiving noise	State or county permissible sound level[2]	Sound mitigation measures[3]	Projected sound level at receiving properties after mitigation[4]
1	Residential properties around Lake No. 12	County - 57 dBA	25-foot-high earth berm along eastern boundary of site; height of berm east of spoil pile 1 added to in increments of 25 feet as lifts are added to pile.	52 - 54 dBA
2	Residential properties along Green River Gorge Road	State - 60 dBA	20- to 25-foot-high earth berm along southern boundary of site; height of berm south and southwest of spoil pile 3 added to as pile increases in height.	58 dBA
3	Residential properties north of the intersection of Highway 169 and Green River Gorge Road	State - 60 dBA	20-foot-high earth berm along southern boundary of the site.	50 - 53 dBA
4	Diamond Ridge Acres subdivision	County - 57 dBA	25-foot-high earth berm north of Pit 2 and west of spoil pile 2; height of berm added to as pile west of spoil pile 2 increase in height.	53 - 54 dBA
5	Residentially zoned properties in Black Diamond between Highway 169 and Black Diamond-Ravensdale Road	State - 60 dBA	20-foot-high earth berm northwest of Pit 2.	50 - 57 dBA

[1]See figure 4.12-2 for general locations of properties listed in this table.

[2]L_{25} sound levels. L_{25} is the sound level not to be exceeded more than 25 percent of the time (15 minutes per hour).

[3]Location of sound mitigation berms is shown in figure 4.12-1.

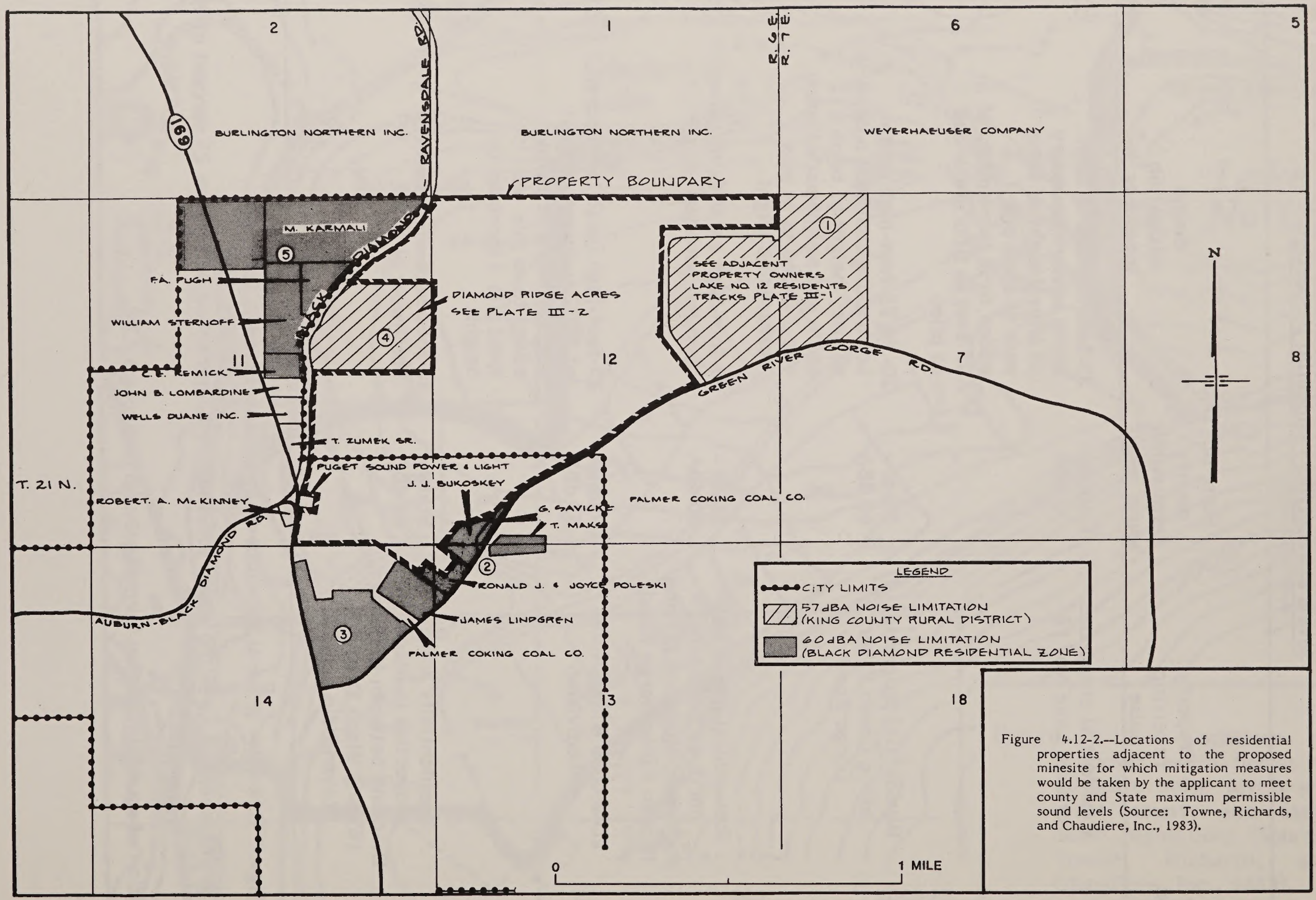


Figure 4.12-2.--Locations of residential properties adjacent to the proposed minesite for which mitigation measures would be taken by the applicant to meet county and State maximum permissible sound levels (Source: Towne, Richards, and Chaudiere, Inc., 1983).

Based upon the blasting procedures outlined in PCCC's permit application, blasting operations would not produce ground vibrations in excess of 0.3 inch per second (maximum peak particle velocity) at the closest structure not owned and/or occupied by the operator. Vibrations of this magnitude would not cause damage to structures but would be perceptible to humans and animals.

PCCC would use procedures to clear the blast area and to secure the area during the loading and blasting sequence. This would preclude the chance of flyrock causing injury or death to animals or persons in the area. Blast warning and "all clear" signals would be given before and after each blast for added protection.

The only time there would be a cumulative effect from noise and ground vibration would be if all mining and preparation plant equipment would be operating at the time the blast was detonated. This would not be likely to happen, given the procedures established for clearing the blast area. Even if it were to occur, the effect would not be significant, inasmuch as the blast detonation sequence lasts only a few seconds.

4.13 VISUAL RESOURCES

The equipment and disturbances of the proposed mining operation, including the mining pits, spoil piles, topsoil piles, earth berms for noise control, sedimentation ponds, roads, and the facilities would be highly visible during the 16.2 years of mine operation to those adjoining property owners residing in Black Diamond and along the western shoreline of Lake No. 12, and to those motorists passing on the Green River Gorge Road, the Black Diamond-Ravensdale Road, and 270th Way S.E. (the north-south road to the homes around Lake No. 12).

Spoil contouring, topsoiling, and vegetation planting would be completed after 19 years. The postmining topography of the area would be almost indistinguishable from the surrounding undisturbed terrain, with the exception of the manmade permanent lake in the present location of Mud Lake (if allowed by OSM), which would appear noticeably different in configuration from natural lakes in the area. Rainfall is abundant, and vegetation, both planted and volunteer, would grow quickly. The timberland, managed for Douglas-fir production, would differ in appearance from surrounding unmined lands because the stand would be more uniform in species composition and height and would have a lower species diversity than the surrounding forest lands.

4.14 CULTURAL RESOURCES

A single archeological survey and a subsequent report describe the cultural resources associated with the proposed John Henry No. 1 permit area (Holmes, 1983). Survey coverage, methods, and data-collection techniques adequately meet Federal requirements (National Historic Preservation Act of 1966, as amended in 1980, Executive Order 11593, 36 CFR 800.4). The Washington State Office of Archeology and Historic Preservation has indicated that "the proposed project will have no effect on known cultural resources included in or eligible for inclusion in the National Register of Historic Places" (appendix B). The negative determination was based on the review of the cultural resources report (Holmes, 1983) and applicable portions of the permit application.

436-784 O - 84 - 7 : QL 3

Cultural resources located adjacent to the permit area may be impacted by mining activities as a result of increased population in the general area. There is the potential for increased vandalism due to an unauthorized collection of cultural materials associated with recreational activity and other pursuits. Also, there is a possibility that cultural-resource inventories based on current technology may not have located all significant sites or data within the survey boundaries. Therefore, the potential exists for destroying unlocated sites.

PCCC has indicated that in the event that prehistoric or historic sites were encountered during operations, the State Office of Archeology and Historic Preservation would be contacted to arrange for evaluation of the site. PCCC would protect the site until the evaluation was completed and clearance was given.

4.15 SAFETY

Working in a coal mine is a hazardous occupation. The Mine Safety and Health Administration's accident figures for Washington for the first 9 months of 1983 indicated there were no fatalities and 31 non-fatal days-lost injuries. This is an average of 7.48 days-lost injuries for every 200,000 person-hours worked in a coal strip mine. The national average for fatalities during the same time period was 0.04 fatalities for every 200,000 person-hours worked in a coal strip mine. Assuming that the national fatality incident rate applies, the employees average 1,840 person-hours a year for 19 years, and an average of 69 employees are actually involved in mining, this would mean about 90 days-lost injuries and no fatalities during the life of the John Henry No. 1 mine.

The safety problems associated with the recreational use of the applicant's proposed lake are briefly discussed in section 4.11, Recreation.

4.16 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Based on anticipated production levels, the John Henry No. 1 mine area would be committed to coal production for 16.2 years. During this time, mining would result in the introduction of additional roads and mine structures. Overall, the mostly forested landscape would be visibly intruded by mine facilities and equipment and by mining excavation and reclamation operations. At the request of the landowner, Palmer Coking Coal Company, the access road would be retained after mining and reclamation is completed.

As the coal is mined, almost all components of the present ecological system, which have developed more or less harmoniously on the affected land over a long period of time, would be modified and in some cases destroyed. Impacts on the topography would be major if OSM approves the applicant's proposal for a 250-foot-deep, 32.5-acre lake and resultant 100-foot-high, 3.9-million-cubic-yard out-of-pit spoil pile.

As much as 180,000 gallons per day of water from Ginder Lake could be consumed by domestic use, the coal processing plant, equipment cleaning, fire control, and dust suppression.

Ground-water quality in the vicinity of the mine area would deteriorate because of mining. This deterioration would probably take place over a long period of time. Ground-water levels in the immediate vicinity of the mining operation would be lowered during mining by dewatering of the pit excavations. As a result, water levels in some of the domestic wells within 1,500 feet of the pit excavation limits would drop, some by several feet. During the life of the mine, the water level in adjoining Lake No. 12 would be reduced a maximum of 0.5 feet in summer owing to ground-water seepage into the pit excavations.

During the 16.2 years of mining activities, there would be a minor deterioration of air quality due to particulate emissions.

During construction and operation of the John Henry No. 1 mine, there would be a loss of vegetation on 363 acres and an accompanying disturbance of wildlife habitat and forest land. However, it is estimated that the minesite would be returned to an equivalent or better timber production capacity.

Terrestrial and aquatic wildlife species would be displaced or destroyed as vegetation, soil, and aquatic habitats (primarily Mud Lake) were disturbed by the mining operation. As a result, minor reductions in local wildlife populations would occur. There would be a long-term loss of habitat diversity for terrestrial wildlife owing to a change in the diversity of the soil resource and the change of vegetation on the site from a mixture of habitat types to a less diverse Douglas fir stand managed for timber production.

During the period of mine operation, the proposed mine would provide employment directly to a maximum of about 93 workers, and indirectly through induced employment to a maximum of 23 to 46 additional persons, thereby enhancing the economy of the region. The city of Black Diamond, King County, and the State of Washington would all benefit directly from tax revenues during the period of mine operation if the proposed minesite is annexed by the city. If the minesite is not annexed, the city would only receive such sales tax revenues as would accrue from wages spent there. Although the city would receive more public tax revenues by annexing the minesite, it would also, in this case, have to spend more money for road maintenance and administrative and regulatory responsibilities.

Development of mine operations and associated facilities would result in increased highway use by workers commuting to and from work and by trucks hauling coal. Therefore, during the 19 years of the mining and reclamation operation, there would be some additional traffic congestion, deterioration of roads, potential for accidents, and noise and dust.

Property values of those homes and lands adjacent to the site have probably already decreased owing to the proposal for mining. This decrease in value would likely continue until the mine area was successfully reclaimed.

Neither noise associated with mining and reclamation activities nor ground vibrations from blasting are expected to be significant outside the proposed mining area; these impacts would occur over the 19-year period of mining and reclamation.

Mining operations and associated activities would degrade the visual resources of the area. Following removal of surface facilities and completion of reclamation, the long-term impact on visual resources would be minor.

4.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The major commitment of resources would be the mining and consumption of 3.46 million tons of clean coal (5.32 million tons of run-of-mine coal) to be used by industrial consumers and State institutions in the Puget Sound area during the 16.2 years of mining.

The quality of topsoil on approximately 363 acres would be irreversibly changed. Soil formation processes, although continuing, would have been irreversibly altered by mining-related activities. Newly formed soil material would be unlike that in the natural landscape in surrounding unmined areas.

Such materials as steel, aluminum, and copper used for the manufacturing of mining machinery and buildings would be committed for the life of the various projects, but much of it would be salvageable upon abandonment.

Loss of life could occur due to both the mining operations and increased vehicular traffic. On the basis of strip-mine accident rates in Washington and the Nation as determined by the Mine Safety and Health Administration for 1983, fatal accidents would occur at the rate of 0.04 per 200,000 man-hours worked; disabling (lost-time) injuries would occur at the rate of 7.48 per 200,000 man-hours worked. This would be an irretrievable commitment of human resources.

Any accidental destruction of presently unknown archeological or paleontological values would be irreversible and irretrievable.

CHAPTER 5

CONSULTATION AND COORDINATION, PUBLIC PARTICIPATION, AND REVIEW

OSM consulted with the U.S. Fish and Wildlife Service on Federal threatened and endangered species (appendix E) and the Washington State Historic Preservation Officer on cultural and historic resources (appendix B).

OSM held a public meeting on July 21, 1983, in Black Diamond, Washington, to obtain public input concerning the proposed John Henry No. 1 mine and to aid in the identification of any significant issues which would have to be addressed in an EIS. A notice of intent to prepare a draft EIS, including a request for public participation in the determination of the scope of the issues, was published in the August 30, 1983, Federal Register (48 F.R. 39306). Public concerns expressed at the public meeting and in response to the Federal Register notice concerned the effects of coal haul trucks on public roads; ground-water hydrology impacts, including the potential for adverse effects on adjacent Lake No. 12, which is surrounded by permanent and seasonal residences; the possible contamination of ground and surface waters; and the effects of blasting upon the residences around Lake No. 12. OSM used all comments received in determining the scope of the draft EIS.

A public hearing on the draft EIS is scheduled to be held by OSM in May 1984 in Black Diamond, Washington. Notice of the hearing will be given in the Federal Register and the Maple Valley, Washington, Voice of the Valley newspaper. Details regarding the hearing will be provided in the public notice. All persons wishing to give oral testimony at the hearing are strongly urged to also provide a written copy of their statements.

The draft EIS will be open for a 60-day public comment and review period. Written comments on the draft document will be accepted at the OSM address shown on the cover sheet until the date indicated on the insert sheet in the front of this document. OSM strongly urges that written comments be submitted as soon as possible.

The draft document will also be available for public review at the following locations:

Office of Surface Mining Reclamation and Enforcement, Western Technical Center, Brooks Towers, 1020 - 15th Street, Denver, Colorado 80202.

Office of Surface Mining Reclamation and Enforcement, Casper Field Office, P.O. Box 1420, Mills, Wyoming 82644.

Office of Surface Mining, c/o U.S. Fish and Wildlife Service, 2625 Parkmont Lane, S.W., Building B3, Olympia, Washington 98502.

This draft EIS document has been mailed to all parties who have expressed an interest in it. Additional copies of the document are available on request from OSM at the address shown on the cover sheet. OSM solicited comments on the draft EIS from the following:

Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- National Park Service
- U.S. Fish and Wildlife Service
- U.S. Geological Survey

Other Federal Agencies
- Department of Labor
  - Mine Safety and Health Administration
- Environmental Protection Agency

State of Washington
- Department of Ecology
- Department of Fisheries
- Department of Game
- Department of Natural Resources
- Department of Transportation
- Department of Social and Health Services
- Office of Archaeology and Historic Preservation
- Parks and Recreation Commission

Regional Agencies
- Puget Sound Council of Governments
- Puget Sound Air Pollution Control Agency
- METRO

King County Agencies
- Zoning and Subdivision Examiner
- Boundary Review Board
- Department of Public Works, Surface Water Management Division and Traffic and Planning Section
- Department of Public Health
- Conservation District
- Department of Public Safety
- Fire Marshal
- Department of Planning and Community Development
- Parks Division
- Office of Agriculture

Other Organizations

Citizens Concerned About Strip Mining
King County Library System
Black Diamond Library
Kent Library
Maple Valley Library
Muckleshoot Library
City of Tacoma, Water Division
Enumclaw School District No. 216
Fire District No. 17
Black Diamond City Council
Auburn City Council
Kent City Council
Enumclaw City Council
Muckleshoot Tribal Council
Seattle Audubon Society
Sierra Club
Washington Environmental Council
Rainier Audubon Society
Enumclaw Unit of League of Women Voters
King County South Unit, League of Women Voters

CHAPTER 6

PREPARERS AND CONTRIBUTORS

Name	Project responsibility	Education
Office of Surface Mining		
Charles M. Albrecht	Technical advisor	Engineer of Mines, Mining, Colorado School of Mines
Joseph J. D'Lugosz	Surface- and ground-water resources	M.S., Geology/Geochemistry, Texas Tech University; B.S., Geology, Eastern New Mexico University
Scott E. Fisher, Jr.	Soils, overburden, revegetation	B.S., Agronomy, Purdue University; Graduate studies, Botany, University of Montana; Range Science, Zoology, University of Wyoming
Charles Harrison	Geology, topography, backfilling, and grading	B.S., Engineering Geology, Western Washington University
Donald R. Henne	Terrestrial and aquatic wildlife	M.S., Wildlife Biology, University of Montana; B.S., Forestry and Wildlife, Virginia Polytechnic Institute and State University
Roger D. Highland	Graphics	Undergraduate studies, Engineering, Northeastern Junior College
Carol B. Hurr	Technical editor	B.A., Secondary Education, Occidental College; Graduate studies, Geology, Colorado School of Mines
Floyd L. Johnson	Air quality, climate	M.S., Meteorology, Utah State University; B.S., Meteorology, Utah State University

Name	Project responsibility	Education
	Office of Surface Mining--Continued	
Foster Kirby	Archeologic, cultural, and historic resources	M.A., Archeology, University of Calgary; B.S., Archeology, University of Calgary; B.A., Anthropology, Washington State University
Timothy C. Richmond	Land use, recreation, visual resources, project leader through October 26, 1983	B.S., Forestry, University of Montana
Michael Rosenthal	Blasting, noise	M.S., Environmental Engineering, West Virginia College of Graduate Studies; B.S. Physics, West Virginia Institute of Technology
Jennifer Shawe	Editor	B.A., English, University of Denver; Graduate studies, English, University of Virginia
Mary Josie Smith	Technical and policy review	M.A., Political Science, University of Texas; B.S., Political Science, University of Texas; A.A., Social Science, Stephens College
Dennis D. Winterringer	Project leader, October 26, 1983, to present	M.S., Wildlife Management, Auburn University; B.S., Fisheries and Wildlife Biology, Iowa State University
	Contractor	
Simons, Li & Associates: R. Michael Stanwood	Socioeconomics and transportation	M.S., Mineral Economics, Colorado School of Mines; B.A., General Science, University of Colorado

CHAPTER 7

REFERENCES CITED

Baldwin, M., Kellogg, C. E., and Thorp, J., 1938, Soil classification, in Soils and men: Washington, D.C., U.S. Department of Agriculture Yearbook of Agriculture, U.S. Government Printing Office, p. 979-1001.

Beikman, H. M., Gower, H. D., and Dana, T. A. M., 1961, Coal resources of Washington: Washington State Department of Conservation, Division of Mines and Geology, and U.S. Geological Survey, Bulletin 47.

Beranek, L. L., editor, 1971, Noise and vibration control: New York, New York, McGraw-Hill Book Company, Chapter 18.

Bureau of Land Management, 1979, Federal coal management program, final environmental statement: Washington, D.C., U.S. Government Printing Office, FES 79-19.

City of Black Diamond, 1980, Comprehensive plan: Black Diamond, Washington.

_____1982, Environmental impact statement on proposed annexation: Black Diamond, Washington.

Environmental Protection Agency, 1977, Valley model user's guide: EPA 450/2-77-018, September 1977, p. 100.

_____1979, Compilation of past practices and interpretations by EPA on air quality review of surface mining operations: Environmental Protection Agency, Region VIII, December 1979, p. 50.

GeoEngineers, Inc., 1983, Report of hydrological services, proposed open pit coal mine development near Black Diamond, Washington: report prepared for Pacific Coast Coal Company, Inc., contained in permit application package.

Holmes, Brian, 1983, Cultural resources survey, John Henry mine No. 1: Black Diamond, Washington, report prepared for Pacific Coast Coal Company.

King County Traffic Division, 1983, Various records: Seattle, Washington, King County.

King County, Washington, 1982, Draft environmental impact statement, John Henry No. 1 mine, Rezone from General (G) to Quarrying and Mining (QM): Seattle, Washington, Department of Planning and Community Development, Building and Land Development Division, November 1982.

_____1983, Supplemental draft environmental impact statement, John Henry No. 1 mine, Rezone from General (G) to Quarrying and Mining (QM): Seattle, Washington, Department of Planning and Community Development, Building and Land Development Division, May 1983.

Mullineaux, D. R., 1965, Geologic map of Black Diamond survey quadrangle, Washington: Washington, D.C., U.S. Geological Survey, U.S. Government Printing Office.

_____1970, Geology of the Renton, Auburn, and Black Diamond quadrangles, King County, Washington: U.S. Geological Survey Professional Paper 672, 92 p.

Pacific Coast Coal Company, Inc., 1983-84, Application for permit, John Henry No. 1 mine: Volumes I-VI, submitted to the Office of Surface Mining, 1983-1984.

Puget Sound Council of Governments, 1983, Population and housing estimates: Seattle, Washington, September 1983, 56 p.

Schasse, H. W., Koler, M. L., and Herman, N. E., 1983, Directory and user's guide to the Washington State coal mine map collection: Olympia, Washington, Washington State Department of Natural Resources, Division of Geology and Earth Resources, Open-File Report 83-8.

Soil Conservation Service, 1973, Soil survey, King County area, Washington: Washington, D.C., U.S. Department of Agriculature, U.S. Government Printing Office, 102 p.

Soil Survey Staff, 1975, Soil taxonomy--A basic system of soil classification for making and interpreting soil surveys: Washington, D.C., Soil Conservation Service, U.S. Government Printing Office, U.S. Department of Agriculture Handbook No. 436, 754 p.

Systems Architects, Engineers, Inc., P.S., 1982, Determination of the probable hydrologic consequences, Black Diamond coal study: Office of Surface Mining Contract No. J5120009, 76 p. plus appendices.

Towne, Richards and Chaudiere, Inc., 1983, Noise mitigation study, John Henry No. 1 mine: report prepared for Pacific Coast Coal Company, Inc., contained in permit application package.

Vine, J., 1969, Geology and coal resources of the Cumberland, Hobart, and Maple Valley quadrangles, King County, Washington: U.S. Geological Survey Professional Paper 624.

Warren, W. C., Norbisnath, H., Grivetti, R. M., and Brown, S. P., 1945, Preliminary geologic map and brief description of the coal fields of King County, Washington: U.S. Geological Survey Coal Investigations Map.

Washington Department of Natural Resources, 1974, Energy resources of Washington: Information Circular No. 50, 158 p.

Washington Department of Transportation, 1983, Various records: Seattle, Washington, State of Washington.

Washington Office of Financial Management, 1983, 1983 population trends for Washington State: Olympia, Washington, State of Washington, August 1983, 89 p.

Wolcott, E. E., 1973, Lakes of Washington: State of Washington, Department of Ecology, Water Supply Bulletin 14, v. 1, p. 96-97.

APPENDIX A

THE APPLICANT'S PROPOSAL

This appendix summarizes the John Henry No. 1 permit application submitted by PCCC to OSM, including those measures by PCCC to mitigate some of the impacts that would result from the mining.

MINING

Data for the proposed mine are given in table A-1. The seven commercially important coal beds within the permit area (fig. A-1) are, from oldest to youngest, the Franklin No. 7 (10 to 19 feet thick), the Franklin No. 8 (8 to 14 feet thick), the Franklin No. 9 (14 to 29 feet thick), the John Henry, a previously unknown coal bed in the northeastern portion of the permit area that is likely a split of the Franklin No. 9 (14 to 17 feet thick), the Franklin No. 10 (3 to 11 feet thick), the Franklin No. 12 (9.9 to 23 feet thick), and the Big Dirty (15 to 39 feet thick). During the 16.2 years of mining, extraction of the coal and reclamation of the mined area would be integrated but sequential, using topsoil stripping, truck-backhoe and front-end loader overburden removal, coal extraction, truck-backhoe and front-end loader spoil backfilling, spoils grading, topsoil replacement, and revegetation.

PCCC anticipates the mine would operate at least 16.2 years, given the 3.46 million clean tons of recoverable coal for the operation. PCCC has applied to OSM for a permit for the first 7 years of operation. The permit area, the areas to be mined and disturbed by the surface coal mining operation, and the location of mine facilities are shown in figure A-2. The mine plan provides a 4-year production buildup period followed by 12.2 years of full production at a mining rate of approximately 385,000 run-of-mine tons of coal, yielding 250,000 tons of clean coal per year.

Raw coal from the mine would consist of approximately 35 percent waste. PCCC has proposed a heavy-media-separation processing plant for the site to remove the waste from the coal. The general layout of the preparation plant is shown in figure A-3. Mined coal would be delivered to the truck hopper by 55-ton trucks and dumped directly into the 100-ton hopper. An open-pile storage area in front of the hopper would be provided in the event trucks could not dump into the hopper. Run-of-mine coal would be fed to a crusher capable of handling 100 run-of-mine tons per hour. After crushing, the coal would be conveyed to the preparation plant. From there, the clean coal would go to the 120-ton clean coal bin and the refuse would go to a 100-ton refuse bin. Coal would be loaded into highway trucks for transport to points of utilization.

The coal from the mine would be transported to consumers in the Pacific Northwest by truck and truck-rail combinations. At full production, approximately 190,000 tons of coal per year, or 76 percent of the coal mined, would be delivered by truck to various consumers in western Washington. The remaining 60,000 tons, or 24 percent of the coal, would be transported to Ravensdale via the Black Diamond-Ravensdale Road and loaded onto trains for further transport by rail to eastern Washington or western Oregon markets. Tables A-2 and A-3 show the run-of-mine coal, clean coal, and spoil and coal processing waste that would be produced, respectively, for the initial 7-year permit term and for years 8 through 16 of the surface coal mining operation.

Initially, one shift of workers would be used at the mine, but once coal production reached approximately 150,000 tons of clean coal per year (year 4 of the mining operation), a second shift of workers would be added. The working

Table A-1.--Data for John Henry No. 1 mine
(Data furnished by Pacific Coast Coal Company, Inc., 1983-84)

	Amount
Affected area	
Acres disturbed:	
Life of mine	363
7-year permit term	204
Acres permitted:	
Life of mine	500
7-year permit term	422
Average topsoil depth (feet)	1.0
Topsoil volume (bank cubic yards)	586,447

	Amount
Coal quantity	
Maximum production rate (tons of run-of-mine coal/year)	385,000
Inplace reserve (tons)	5,911,111
Recovered reserve (tons)	5,320,000
Percent recovered	85-95
Acres extracted	170

	Heating capacity or percentage content
Coal quality	
Btu (as received)	10,500-12,500
Percentage ash (as received)	10-17
Percentage sulfur (as received)	0.5-0.8
Percentage volatiles (as received)	25-30
Percentage fixed carbon (as received)	43-55
Percentage equilibrium moisture	9-12

	Amount
Overburden	
Range (feet)	0 to 250
Overburden removed, including coal processing waste (bank cubic yards):	
Life of mine	28,140,000
7-year permit term	11,315,000
Stripping ratio (bank cubic yards/ton run-of-mine coal):	
Life of mine	5.29
7-year permit term	6.18

	Description
Miscellaneous	
Maximum number of employees	93 persons
Mine life (mining and reclamation)	19 years
Access road	Paved east-west road from Black Diamond-Ravensdale Road to facilities
Location	Black Diamond, Washington, approximately 27 miles southeast of Seattle
Owner, operator	Pacific Coast Coal Company, Inc.

436-784 O - 84 - 8 : QL 3

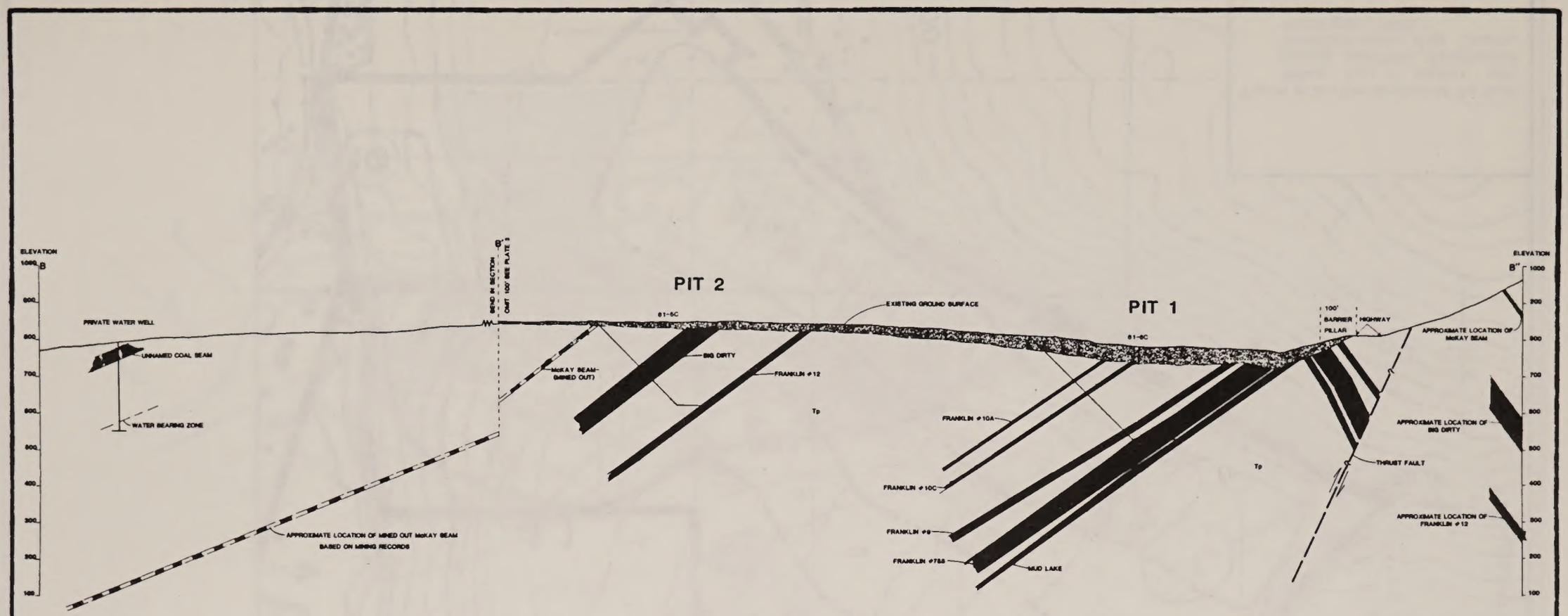


Figure A-1.--Geologic profile of the proposed John Henry No. 1 mine showing locations of coal seams in Pits 1 and 2 (modified from Pacific Coast Coal Company, Inc., 1983-84). The John Henry coal bed is not present in this cross section.

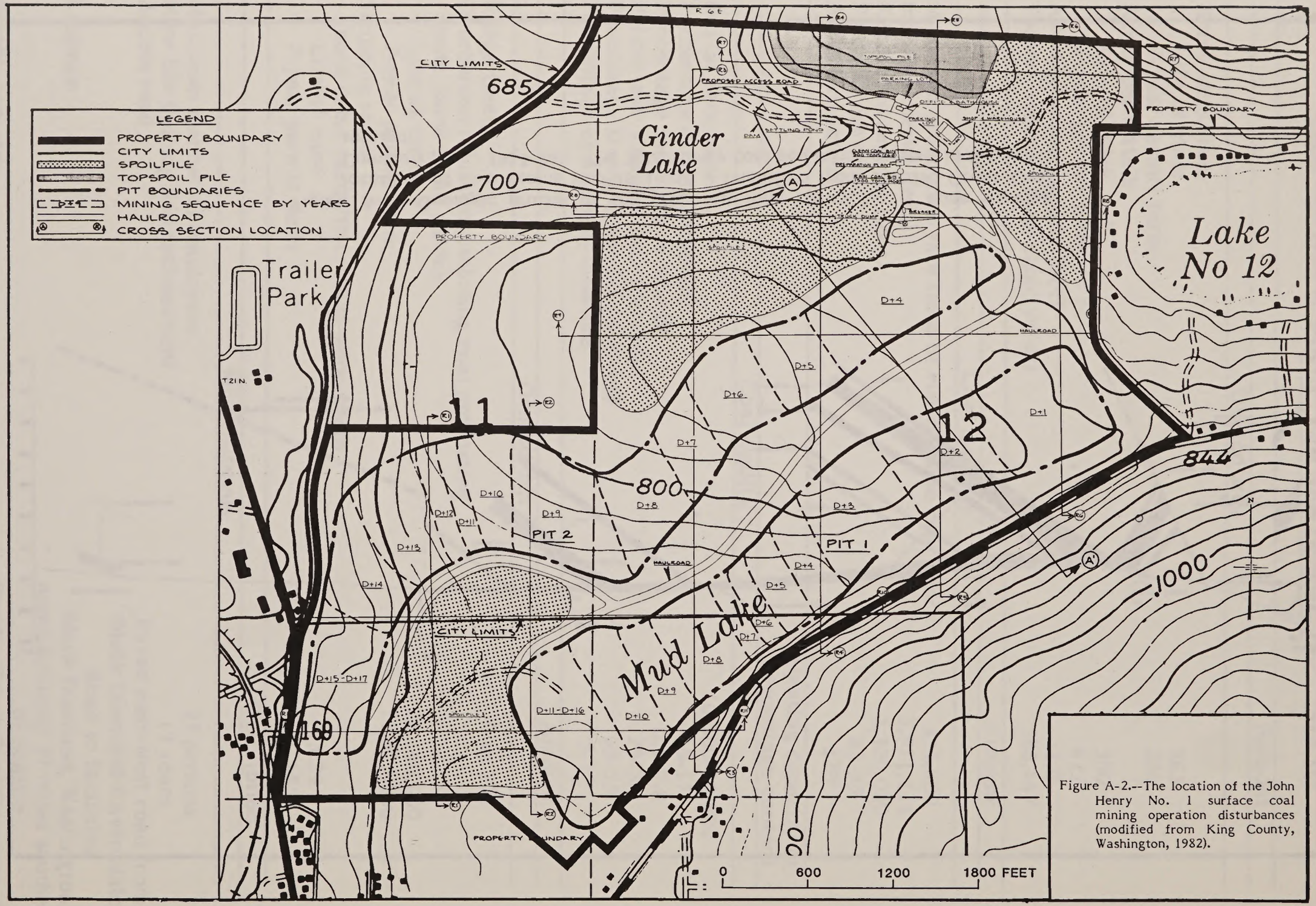


Figure A-2.--The location of the John Henry No. 1 surface coal mining operation disturbances (modified from King County, Washington, 1982).

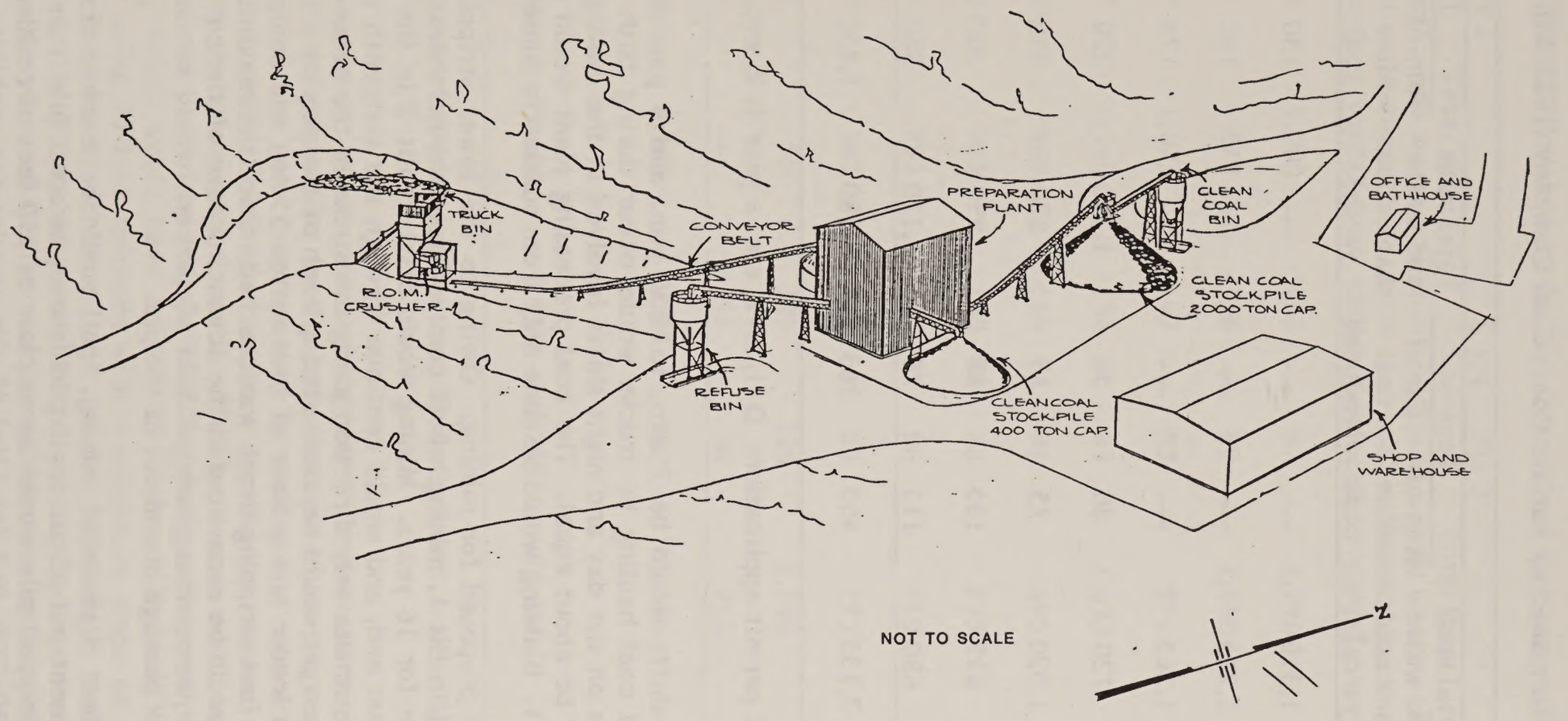


Figure A-3.--Artist's conception of the proposed general arrangement of the John Henry No. 1 mine coal preparation plant (King County, Washington, 1982).

Table A-2.--Tonnage of run-of-mine coal and clean coal, and volume of spoil and coal processing waste produced during the initial 7-year permit term

(Data furnished by Pacific Coast Coal Company (1983-84))

Year[1]	Pit 1			Pit 2			Total		
	Tons		Total spoil and waste (bank cubic yards)	Tons		Total spoil and waste (bank cubic yards)	Tons		Total spoil and waste (bank cubic yards)
	Run-of-mine coal	Clean coal produced		Run-of-mine coal	Clean coal produced		Run-of-mine coal	Clean coal produced	
D+1	130	80	1,310	---	---	---	130	80	1,310
D+2	160	100	1,285	---	---	---	160	100	1,285
D+3	175	100	1,265	---	---	---	175	100	1,265
D+4	140	90	720	80	50	1,150	220	140	1,870
D+5	305	201	1,020	75	49	870	380	250	1,890
D+6	250	162	855	135	88	990	385	250	1,845
D+7	265	174	680	115	76	1,170	380	250	1,850
Total	1,425	907	7,135	405	263	4,180	1,830	1,170	11,315

[1]D = Date of approval of permit application; D+1, D+2, etc. = year 1, 2, etc. of mining operation.

hours of the two shifts would be 7 a.m. to 3:30 p.m. and 4 p.m. to 12:30 a.m. Active mining and coal hauling by trucks would occur during both shifts. The number of workers on the day and night shifts involved in the mining of coal and reclamation would be about equal. The coal processing plant would only operate during the day shift. Blasting would be done only from sunrise to sunset.

Two pits are proposed for mining. Owing to the lower stripping ratio and better quality coal in Pit 1, mining would commence in the northeast end of Pit 1 and would continue for 16 years. Mining would start in Pit 2 in the fourth year, also in the northeast end, and would continue through the sixteenth year. Mining would occur in a southwesterly direction along the strike in the sequence shown in figure A-2. An open pit would be excavated in each of the pits by a 12-cubic-yard capacity front-end loader and a fleet of four to ten 55-ton end-dump trucks until the maximum 250-foot stripping depth was reached. Once the maximum depth was reached, benches would be excavated in the advancing face of the cut in a steplike configuration, and ramps at a grade of 8 to 10 percent would be constructed on them to allow truck passage in and out of the pit.

During the first 3 years of mining, spoil would be trucked from Pit 1 and placed in a permanent out-of-pit spoil pile (shown as spoil pile 1 in figure A-2). (Note: Parts of this spoil pile would lie as close as 150 feet of residences on Lake No. 12. Section 30 CFR 947.761.11(e) of the regulations prohibits surface coal mining operations within 300 feet of any occupied dwelling unless the owner has

Table A-3.--Tonnage of run-of-mine coal and clean coal, and volume of spoil and coal processing waste produced during years 8 through 16 of the surface coal mining operation

(Data furnished by Pacific Coast Coal Company (1983-84))

Year[1]	Pit 1			Pit 2			Total		
	Tons		Total spoil and waste (bank cubic yards)	Tons		Total spoil and waste (bank cubic yards)	Tons		Total spoil and waste (bank cubic yards)
	Run-of-mine coal	Clean coal produced		Run-of-mine coal	Clean coal produced		Run-of-mine coal	Clean coal produced	
D+8	232	153	1,000	153	97	1,290	385	250	2,290
D+9	229	151	870	156	99	1,440	385	250	2,310
D+10	238	157	1,075	147	93	976	385	250	2,040
D+11	253	167	1,140	132	83	1,035	385	250	2,175
D+12	241	159	960	144	91	890	385	250	1,850
D+13	245	162	905	140	88	825	385	250	1,730
D+14	233	154	795	147	96	910	380	250	1,705
D+15	253	167	565	123	83	775	376	250	1,340
D+16	36	24	55	329	226	1,120	365	250	1,175
D+16.2	---	---	---	55	36	210	55	36	210
Total	1,960	1,294	7,365	1,526	992	9,460	3,486	2,286	16,825
Life-of-mine total	3,385	2,191	14,500	1,931	1,255	13,640	5,316	3,456	28,140

[1]D = Date of approval of permit application; D+8, D+9, etc. = year 8, 9, etc. of mining operation.

provided a written waiver consenting to a lesser distance. The following description of the permanent spoil pile is the operator's proposal. The location or configuration of the pile may have to be changed if waivers from homeowners cannot be obtained.) Foundation support for the permanent spoil pile would be dense to very dense sandstone or till. This spoil area would be constructed in 30-foot lifts and compacted by the spoil hauling and grading equipment. The outslope of the pile, which would have an overall slope of 3h:1v (33 percent), would be constructed using 30-foot terraces with a maximum slope of 2h:1v (50 percent). French drains would collect and drain subsurface and surface water. Approximately 185,000 cubic yards of coal processing waste would be mixed with 3.9 million cubic yards of spoil in this permanent overburden pile.

Initial backfilling of spoil into the mined-out portion of Pit 1 would take place during years 4 and 5 of mining, but direct backfilling of spoil from the advancing face to the mined-out area would not be constant until year 7. After year 4, a 4.25-cubic-yard capacity backhoe would assist in loading the spoil. As backfilling progressed, roads on approximately every third bench would be developed along the highwall for use by trucks to turn and dump. Backfilling would begin from the lower level and then move up to the next higher level, as required. When all coal within the two pits was mined out, 4.4 million bank cubic yards of stockpiled spoil (spoil piles 2 and 3 in fig. A-2) would be returned to the mined-out portion of Pit 2. Over the life of the mine, 1.86 million tons of waste from the coal processing plant would be intermixed with overburden in the permanent spoil stockpile and in the backfilled pits.

Blasting would be used to fragment the overburden material prior to removal. One diesel rotary drill with a 6-3/4-inch bore diameter would drill vertical holes in the shale and sandstone rock overlying the coal in a 17-foot by 17-foot spacing pattern. The primary blasting agent, ammonium nitrate and fuel oil mixture (ANFO), would be loaded in the holes and shot at a projected powder factor of 0.56 pound of explosive per cubic yard of overburden material to be blasted. The coal would be ripped by a bulldozer where possible. Remaining coal and partings would be drilled by a 3.5-inch-diameter bore drill at an angle vertical to the slope of the coal and loaded and shot with ANFO at an anticipated powder factor of 0.40 pound of ANFO per cubic yard of material to be blasted. Some slurry explosives would be required in holes where water accumulates. The blasting system would consist of a noiseless trunkline initiated by a 22-caliber primer, nonelectric delay caps, 25-grain-per-foot detonating cord and boosters for down-the-hole initiation, and ANFO. Blasting would only be performed from sunrise to sunset in the time periods indicated in the public notice of the blasting schedule. The notice must annually be published in a local newspaper and distributed by mail to local governments, utilities, and each resident within one-half mile of the permit area. A preblasting survey of each residence within one-half mile of the 7-year permit blasting locations (i.e., the pit excavation limits) would be made by an independent party hired by PCCC if requested by the residents or by OSM. The survey report would describe and analyze cracks and would include photographs of existing damage and, for each residence, a house shell layout plan, an analysis of each wall, a plan for each house floor, a plan for each room, and available well, piping, and electrical information. Equipment would be used to monitor all blasts within 1,000 feet of inhabited structures.

King County Noise Ordinance No. 3139 and Washington Administrative Code, Chapter 173-60, require that the basic permissible sound level during daytime hours of operation be less than 57 dBA at the receiving properties in King County (including those residences around Lake No. 12 and the Diamond Ridge Acres subdivision) and less than 60 dBA for the offsite properties in Black Diamond. The permissible sound levels drop 10 dBA to 47 dBA and 50 dBA, respectively, after 10 p.m. These levels may only be exceeded by 5, 10, or 15 dBA for total durations not exceeding 15, 5, or 1.5 minutes per hour, respectively. To comply with these regulations, PCCC would use a combination of earth berm sound barriers and setbacks from residential properties around Lake No. 12, along the Green River Gorge Road, north of the intersections of Highway 169 and Green River Gorge Road, the Diamond Ridge Acres subdivision, and properties in Black Diamond between Highway 169 and the Black Diamond-Ravensdale Road. The earth berms would be constructed 20 or 25 feet high and at distances varying from 100 to 850 feet from the receivers of the sound.

To control dust pollution, paved roads would be periodically flushed with water during the dry season, unpaved roads would be treated with chemical dust suppressants and watered whenever necessary, the coal processing dust conveyors and transfer station would be partially enclosed, water sprays would be used at the run-of-mine coal dump, and a dust collector would be provided for the overburden drill. One portable high-volume air sampler would be used to monitor the effects of mining on air quality. The sampler would be located to the extent possible at the mine perimeter downwind from the mine.

Surface-water diversion ditches, sedimentation ponds, and vegetation filters would be used to minimize the amount of suspended solids in water leaving the mine area. Drainage control structures would be designed for a 10-year, 24-hour storm, with a 24-hour detention time for the sedimentation ponds. Sixteen ponds ranging in runoff storage capacity from 0.11 to 4.83 acre-feet and averaging 2.8 acre-feet per pond would be constructed over the life of the mine. Fourteen of the ponds would be constructed in the initial 7-year permit period. Total sediment storage capacity of the ponds would average 0.04 acre-foot for every disturbed acre of drainage. In addition to the ponds, combination sump-detention structures would be constructed in the pits. These sumps would advance with the pits and be sized to retain a maximum pump rate of 500 gallons per minute for 24 hours. Grassed and rocked ditches would carry water from undisturbed areas away from the mining areas and convey water from areas disturbed by mining activities to ponds for settling. A monitoring program sampling water quality and quantity upstream and downstream from the mine area would be carried out.

Ground-water wells and domestic wells that could be impacted by the mining would be monitored quarterly, before, during, and following mining, for ground-water level, infiltration rates, subsurface flow, storage characteristics, flow, temperature, and water quality.

A water line right-of-way owned by the city of Tacoma passes through the proposed permit area (fig. 1.3-5). Palmer Coking Coal Company, the property owner, has a letter of understanding with Tacoma that if the water pipeline is built during the life of the mine, the line would be rerouted to avoid the mining operations, with the applicant paying for any extra costs associated with the reroute.

Approximately 1 to 2 feet of topsoil (about 586,447 cubic yards) would be salvaged and stored in the single topsoil stockpile north of the facilities area. Removal of topsoil would occur 6 to 12 months in advance of disturbance.

RECLAMATION

Recontouring, retopsoiling, and planting would be completed within 19 years of commencement of the operation (table A-4). In the third year of operations, spoil pile 1, the permanent spoil pile, would be graded to a 3h:1v overall slope and terraced with 2h:1v slopes between benches, topsoiled, and planted. A small portion of Pit 1 would be graded to final contour, topsoiled, and planted by the sixth year. All surface facilities and structures, except the access/haul road, would be removed. At the request of the landowner, the access/haul road would be retained to provide access for timber equipment associated with reforestation and timber harvesting. All ditches and ponds would be filled in, graded, and revegetated.

Table A-4.--Schedule for reclaiming disturbed acreages

(Data furnished by Pacific Coast Coal Company (1983-84))

Year[1]	Location	Acres		
		Disturbed	Recontoured and topsoiled	Planted
D+1	Miscellaneous[2]	14.4	---	---
D+2	Pit 1	21.5	---	---
	Pit 2	---	---	---
	Miscellaneous	46.0	---	---
	Subtotal	67.5	---	---
D+3	Pit 1	9.8	---	---
	Pit 2	---	---	---
	Miscellaneous	31.7	27.6	27.6
	Subtotal	41.5	27.6	27.6
D+4	Pit 1	4.3	---	---
	Pit 2	12.6	---	---
	Miscellaneous	0.6	---	---
	Subtotal	17.5	---	---
D+5	Pit 1	4.4	---	---
	Pit 2	6.3	---	---
	Miscellaneous	45.6	---	---
	Subtotal	56.3	---	---
D+6	Pit 1	4.0	4.4	4.4
	Pit 2	7.3	---	---
	Miscellaneous	---	---	---
	Subtotal	11.3	4.4	4.4
D+7	Pit 1	2.8	4.0	4.0
	Pit 2	7.3	1.6	1.6
	Miscellaneous	---	---	---
	Subtotal	10.1	5.6	5.6
D+8	Pit 1	7.6	2.8	2.8
	Pit 2	5.7	2.4	2.4
	Miscellaneous	---	---	---
	Subtotal	13.3	5.2	5.2
D+9	Pit 1	5.6	1.0	1.0
	Pit 2	12.4	9.7	9.7
	Miscellaneous	9.2	---	---
	Subtotal	27.2	10.7	10.7

Table A-4.--Schedule for reclaiming disturbed acreages--Continued

Year[1]	Location	Acres		
		Disturbed	Recontoured and topsoiled	Planted
D+10	Pit 1	7.0	3.4	3.4
	Pit 2	7.0	10.2	10.2
	Miscellaneous	3.1	---	---
	Subtotal	17.1	13.6	13.6
D+11	Pit 1	14.4	7.0	7.0
	Pit 2	3.2	7.0	7.0
	Miscellaneous	10.1	---	---
	Subtotal	27.7	14.0	14.0
D+12	Pit 1	---	7.4	7.4
	Pit 2	0.8	4.0	4.0
	Miscellaneous	---	---	---
	Subtotal	0.8	11.4	11.4
D+13	Pit 1	---	8.9	8.9
	Pit 2	7.8	9.1	9.1
	Miscellaneous	11.7	---	---
	Subtotal	19.5	18.0	18.0
D+14	Pit 1	---	1.9	1.9
	Pit 2	6.7	7.8	7.8
	Miscellaneous	---	---	---
	Subtotal	6.7	9.7	9.7
D+15	Pit 1	---	2.0	2.0
	Pit 2	12.3	6.7	6.7
	Miscellaneous	15.4	---	---
	Subtotal	27.7	8.7	8.7
D+16	Pit 1	---	3.0	3.0
	Pit 2	---	1.3	1.3
	Miscellaneous	---	1.9	1.9
	Subtotal	---	6.2	6.2
D+17	Pit 1	---	8.6	8.6
	Pit 2	---	7.3	7.3
	Miscellaneous	3.1	37.6	37.6
	Subtotal	3.1	53.5	53.5
D+18	Pit 1	---	17.8	17.8
	Pit 2	---	6.7	6.7
	Miscellaneous	1.8	49.5	49.5
	Subtotal	1.8	74.0	74.0

436-784 O - 84 - 9 : QL 3

Table A-4.--Schedule for reclaiming disturbed acreages--Continued

Year[1]	Location	Acres		
		Disturbed	Recontoured and topsoiled	Planted
D+19	Pit 1	---	9.2	9.2
	Pit 2	---	18.6	18.6
	Miscellaneous	---	76.1	76.1
	Subtotal	---	100.9	100.9
Totals	Pit 1	81.4	81.4	81.4
	Pit 2	89.4	89.4	89.4
	Miscellaneous	192.7	192.7	192.7
	Subtotal	363.5	363.5	363.5

[1]D = Date of approval of permit application; D+1, D+2, etc. = year 1, 2, etc. of mining and reclamation operation.

[2]Miscellaneous includes road areas, facility areas, spoils, and berms.

The disturbed area, except for the permanent spoil pile 1 and a "final cut" lake in Pit 1, would be backfilled, graded, and recontoured to approximate the original contour of the land (fig. A-4). The proposed lake would be over 250 feet deep, cover a surface area of approximately 32.5 acres, and have a total storage of about 2,020 acre-feet at low water and 2,100 acre-feet at high water. A 5-acre parcel of land on the lake would be donated to Black Diamond for use as a park (fig. A-4). GeoEngineers, Inc., a contractor for PCCC, predicts the lake would fill up between 2.5 and 3 years after completion of mining operations.

A 12.5- to 14-acre wetland for wildlife use would be constructed on the upstream (east) end of the lake. The dimensions of the wetland would be approximately 575 feet from north to south and 1,100 feet from west to east. The water level in the wetland would be controlled by an outflow structure on the lake that would raise the lake 2 feet to back up water into the wetland; a 0.5-foot berm, with a water-control structure across the west end of the wetland (where it would interface with the lake), would also control the water level in the wetland during low-water periods. A minimum of four small islands would be constructed for waterfowl loafing and nesting areas, for increased plant diversity and niches, and for water diversion of the 6-inch-deep channels routing the water through the wetland. Sediment-collection sinks would be constructed at the inlets to the major water inflows. A minimum of 2 feet of peat/topsoil would be replaced over the final contoured spoil of the wetland area. Stock plants would be transplanted in narrow communities in areas prone to erosion: channels and channel banks, sediment sinks, and the borders of islands. Ten pounds of seed per acre mixed with fertilizer would be broadcast over the area. Six different planting/transplanting mixtures would be planted in specific areas of the wetland. A cellulose fiber mat would be sprayed over the seed. The thirteen plant species that would be planted in the wetland are slough sedge (Carex obnupta), inflated sedge (Carex vesicaria),

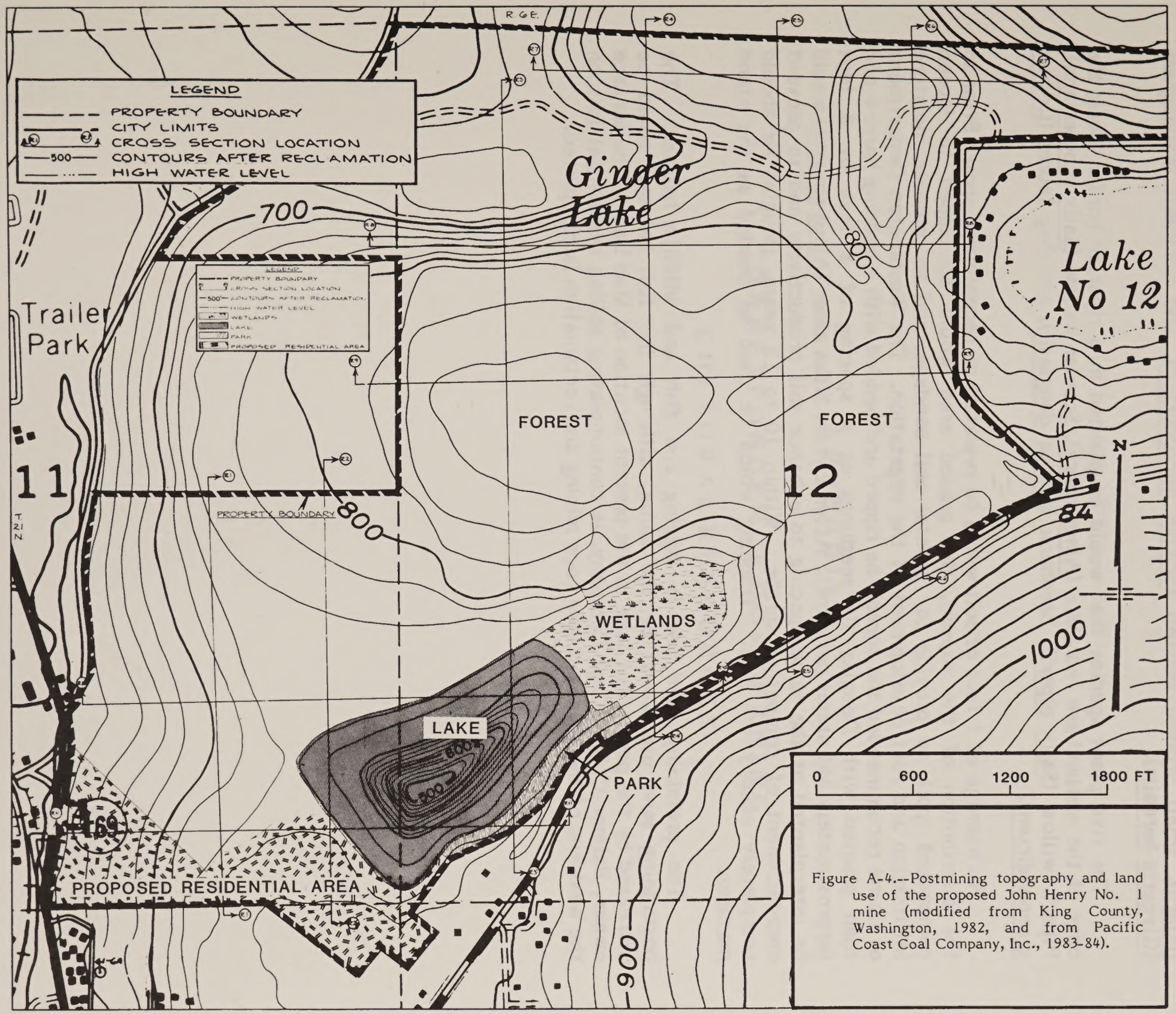


Figure A-4.--Postmining topography and land use of the proposed John Henry No. 1 mine (modified from King County, Washington, 1982, and from Pacific Coast Coal Company, Inc., 1983-84).

redroot cyperus (Cyperus erythrorhizos), soft stem burbush (Scirpus validus), water plantain (Alisma plantago-aquatica), marsh cinquefoil (Pontentilla palustris), water horsetail (Equisetum fluviatle), slough grass (Bechmania syzigachne), cattail (Typha latifolia), western yellowcress (Rorippa currisiligua), liverwort (Ricciocarpus natans), small fruited bulrush (Scirpis microcorpus), and northern mannagrass (Glyceria borealis).

The five plant species that would be planted in a riparian border along the edge of the wetland are red alder (Alnus rubra), Scouler willow (Salix scouleriana), Piper's willow (Salix piperi), hardhack (Spirea douglasii), and bog laurel (Ledum groenandicum).

An average of 1 foot of soil would be replaced on recontoured spoil. Prior to the distribution of the topsoil, the graded area would be ripped to loosen compacted spoil, to provide for greater soil bondage, and to promote moisture infiltration and root development of the vegetation. The Washington Department of Game recommended the topsoil be ripped and bedded with a bedding harrow and then planted with Douglas fir seedlings at a spacing of 8 feet by 8 feet (approximately 861 stems per acre). After 1 year, Sitka alder (Alnus sinuata) would be interplanted at the same spacing to enhance soil productivity and to prevent encroachment of competing shrubs. Within 10 to 15 years, Douglas fir should completely occupy the site. Thinning would be used as needed as the stand matures.

The premining land use is logging and fish and wildlife habitat. The postmining land use would be the same, although the fish habitat would be increased by the permanent lake in the present location of Mud Lake. The surface owner, Palmer Coking Coal Company, is contemplating selling residential lots on the west end of the proposed lake once mining and reclamation is completed.

APPENDIX B

CORRESPONDENCE CONCERNING CULTURAL RESOURCES

JOHN SPELLMAN
Governor

JACOB THOMAS
Director

STATE OF WASHINGTON
OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
111 West Twenty-First Avenue, KL-11 • Olympia, Washington 98504 • (206) 753-4011

February 29, 1984

Mr. Rex L. Wilson
Chief Archaeologist
Office of Surface Mining
1020 15th Street
Denver, CO 80202

Re: John Henry #1 Mine
Black Diamond, Washington

Dear Mr. Wilson:

We have reviewed the materials forwarded to us for the above referenced project. Based on the information provided for our review, in our opinion the proposed project will have no effect on known cultural resources included in or eligible for inclusion in the National Register of Historic Places.

Thank you for this opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist

dw

APPENDIX C

SURFACE-WATER QUALITY DATA

Table C-1.--Premining surface-water quality data for sampling point on Lake No. 12

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	04/19/82	05/07/82	06/15/82	07/14/82	Mean
Flow (cfs)[1]	0.28	0.85	0.00	0.00	0.00	0.24
Temperature (°C)[2]	6.7	7.7	9.0	20.5	20	---
pH	6.1	5.5	7.7	7.35	7.3	6.8
Specific conductivity (µmhos/cm)[3]	46	44	32	77	41	---
Arsenic	<0.002	<0.005	---	---	---	---
Cadmium	.002	<.001	---	---	---	---
Calcium[4]	3.2	3.0	---	---	---	---
Chromium	<.01	<.01	---	---	---	---
Iron:						
Total	.33	.17	.44	.30	.27	.30
Dissolved[4]	.29	.09	.30	.10	.23	---
Lead	<.01	<.01	---	---	---	---
Magnesium[4]	1.2	1.3	---	---	---	---
Manganese:						
Total	.02	.01	.02	.040	.033	.02
Dissolved[4]	.01	.01	.01	.009	.018	---
Mercury	<.001	<.001	---	---	---	---
Potassium[4]	.03	.3	---	---	---	---
Sodium[4]	3	3.9	---	---	---	---
Zinc	.005	<.01	---	---	---	---
Nitrate/nitrite	2.4	1.9	---	---	---	---
Bicarbonate-Alkalinity ($CaCO_3$)	15	12	---	---	---	---
Total suspended solids	13	8	11	3	4	7.8
Total dissolved solids	46	69	---	---	---	---
Total hardness ($CaCO_3$)	22	24	---	---	---	---
Acidity ($CaCO_3$)	4	4	---	---	---	---
Total alkalinity ($CaCO_3$)	12	10	---	---	---	---
Chloride	2	2	---	---	---	---
Sulfate (SO_4)	4	5	---	---	---	---

[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table C-2.--Premining surface-water quality data for sampling point on Ginder Lake

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	04/19/82	05/07/82	06/18/82	07/14/82	Mean
Flow (cfs)[1]	0.26	<0.01	<0.01	0.01	0.026	0.06
Temperature (°C)[2]	7.2	8.9	14.4	18	18	---
pH	6.1	6.5	7.4	6.75	6.8	6.7
Specific conductivity (µmhos/cm)[3]	---	145	132	175	195	---
Arsenic	<0.002	<0.005	---	---	---	---
Cadmium	<.002	<.001	---	---	---	---
Calcium[4]	16.3	15	---	---	---	---
Chromium	<.01	<.01	---	---	---	---
Iron:						
Total	.18	.43	.33	.80	.38	.42
Dissolved[4]	.05	.17	.25	.29	.26	---
Lead	<.01	<.01	---	---	---	---
Magnesium[4]	10.3	7.8	---	---	---	---
Manganese:						
Total	.02	.03	.02	.029	.20	.06
Dissolved[4]	.02	.03	.02	.002	.010	---
Mercury	<.001	<.001	---	---	---	---
Potassium[4]	1.1	1.5	---	---	---	---
Sodium[4]	12	7.8	---	---	---	---
Zinc	<.005	.02	---	---	---	---
Nitrate/nitrite	2.9	.6	---	---	---	---
Bicarbonate-Alkalinity ($CaCO_3$)	170	91	---	---	---	---
Total suspended solids	---	4	<2	5	5	4
Total dissolved solids	---	130	---	---	---	---
Total hardness ($CaCO_3$)	140	83	---	---	---	---
Acidity ($CaCO_3$)	4	4	---	4	2.5	---
Total alkalinity ($CaCO_3$)	139	73	---	---	---	---
Chloride	1	2	---	---	---	---
Sulfate (SO_4)	12	10	---	---	---	---

[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table C-3.--Premining surface-water quality data for sampling point No. 1 on Ginder Creek

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	04/19/82	05/07/82	06/15/82	07/14/82	Mean
Flow (cfs)[1]	3.29	3.79	1.09	0.12	0.216	1.7
Temperature (^{o}C)[2]	7.8	9.8	13.4	14.6	14	---
pH	6.1	7.0	7.1	7.2	7.75	7.0
Specific conductivity (µmhos/cm)[3]	122	138	132	160	170	---
Arsenic	<0.002	<0.005	---	---	---	---
Cadmium	<.002	<.001	---	---	---	---
Calcium[4]	9.2	12	---	---	---	---
Chromium	<.01	<.01	---	---	---	---
Iron:						
Total	.59	.31	.40	.70	.66	.53
Dissolved[4]	.16	.17	.22	.32	.44	---
Lead	<.01	<.01	---	---	---	---
Magnesium[4]	4.2	6.4	---	---	---	---
Manganese:						
Total	.02	.02	.03	.048	.055	.03
Dissolved[4]	.02	<.01	<.01	.017	.024	---
Mercury	<.001	<.001	---	---	---	---
Potassium[4]	.8	.9	---	---	---	---
Sodium[4]	6	6.4	---	---	---	---
Zinc	.007	<.01	---	---	---	---
Nitrate/nitrite	1.4	.51	---	---	---	---
Bicarbonate-Alkalinity ($CaCO_3$)	59	85	---	---	---	---
Total suspended solids	10	4	2	5	5	5.2
Total dissolved solids	91	130	---	---	---	---
Total hardness ($CaCO_3$)	80	68	---	---	---	---
Acidity ($CaCO_3$)	3	2	---	---	---	---
Total alkalinity ($CaCO_3$)	48	68	---	---	---	---
Chloride	2	3	---	---	---	---
Sulfate (SO_4)	12	12	---	---	---	---

[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table C-4.--Premining surface-water quality data for sampling point No. 2 on Ginder Creek

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	04/19/82	05/07/82	06/15/82	07/14/82	Mean
Flow* (cfs)[1]	4.98	3.54	1.00	0.10	0.453	2.62
Temperature (°C)[2]	7.2	9.5	11.2	12.8	13	---
pH	6.5	6.8	7.2	7.7	7.85	7.2
Specific conductivity (μmhos/cm)[3]	107	124	128	170	165	---
Arsenic	<0.002	<0.005	---	---	---	---
Cadmium	<.002	<.001	---	---	---	---
Calcium[4]	7.9	9.9	---	---	---	---
Chromium	<.01	<.01	---	---	---	---
Iron:						
Total	.43	.34	.61	1.0	1.40	.76
Dissolved[4]	.15	.20	.43	.63	.78	---
Lead	<.01	<.01	---	---	---	---
Magnesium[4]	4.1	5.6	---	---	---	---
Manganese:						
Total	.02	.03	.04	.068	.17	.07
Dissolved[4]	.02	.01	.02	.003	.028	---
Mercury	<.001	<.001	---	---	---	---
Potassium[4]	.9	.9	---	---	---	---
Sodium[4]	6	6.2	---	---	---	---
Zinc	.006	<.01	---	---	---	---
Nitrate/nitrite	1.6	.62	---	---	---	---
Bicarbonate-Alkalinity ($CaCO_3$)	48	71	---	---	---	---
Total suspended solids	14	3	2	7	10	7.2
Total dissolved solids	88	95	---	---	---	---
Total hardness ($CaCO_3$)	64	57	---	---	---	---
Acidity ($CaCO_3$)	4	2	---	---	---	---
Total alkalinity ($CaCO_3$)	39	57	---	---	---	---
Chloride	2	2	---	---	---	---
Sulfate (SO_4)	10	10	---	---	---	---

*Flow on 02/26/82 was 5.69 cfs.
[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table C-5.--Premining surface-water quality data for sampling point on Mud Lake

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	04/19/82	05/07/82	06/15/82	07/14/82	Mean
Flow (cfs)[1]	3.13	2.25	0.38	0.00	0.037	1.2
Temperature (°C)[2]	6.7	7.1	10.0	20.5	12	---
pH	6.1	6.2	7.9	7.35	7.0	6.9
Specific conductivity (µmhos/cm)[3]	50	46	49	130	155	---
Arsenic	0.002	<0.005	---	---	---	---
Cadmium	<.002	<.001	---	---	---	---
Calcium[4]	3.1	3.6	---	---	---	---
Chromium	<.01	<.01	---	---	---	---
Iron:						
Total	.31	.37	1.1	2.1	.84	.99
Dissolved[4]	<.02	.22	.67	.23	.46	---
Lead	<.01	<.01	---	---	---	---
Magnesium[4]	1.5	1.7	---	---	---	---
Manganese:						
Total	<.01	.02	.04	.12	.31	.1
Dissolved[4]	<.01	<.01	.02	.010	.083	---
Mercury	<.001	<.001	---	---	---	---
Potassium[4]	.6	.5	---	---	---	---
Sodium[4]	3	2.8	---	---	---	---
Zinc	.009	<.01	---	---	---	---
Nitrate/nitrite	.89	.43	---	---	---	---
Bicarbonate-Alkalinity ($CaCO_3$)	16	21	---	---	---	---
Total suspended solids	6	9	5	96	19	27
Total dissolved solids	49	71	---	---	---	---
Total hardness ($CaCO_3$)	26	19	---	---	---	---
Acidity ($CaCO_3$)	2	2	---	---	---	---
Total alkalinity ($CaCO_3$)	13	17	---	---	---	---
Chloride	2	1	---	---	---	---
Sulfate (SO_4)	6	8	---	---	---	---

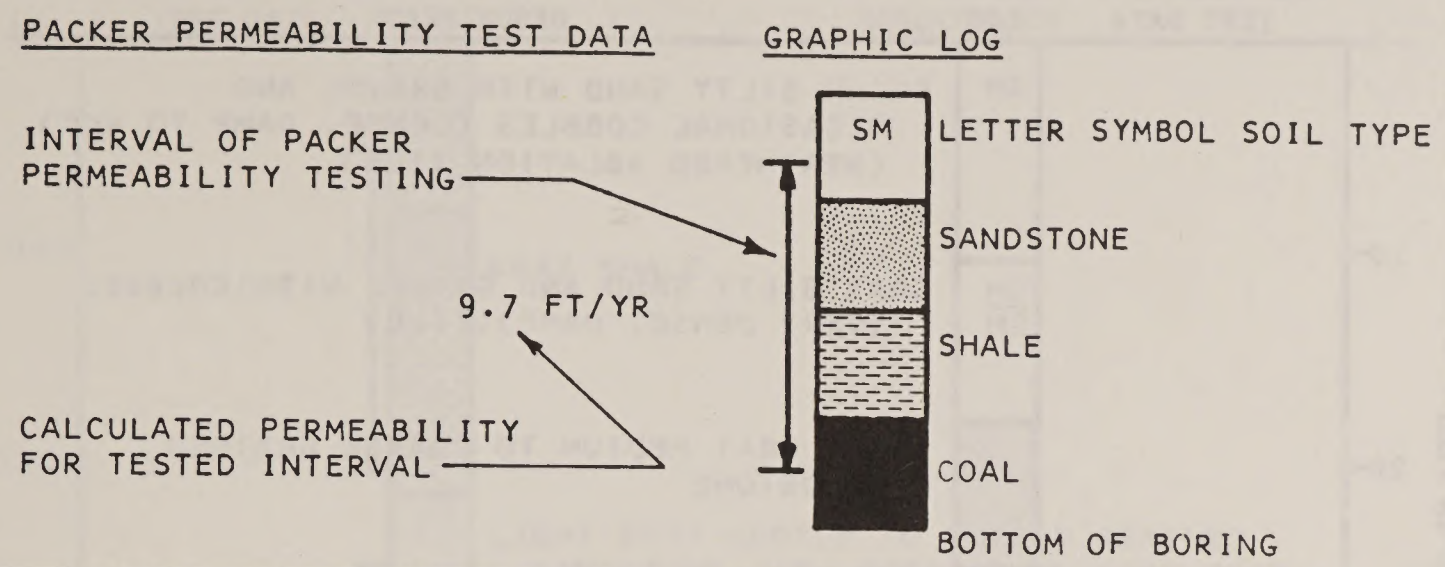
[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

APPENDIX D

OVERBURDEN PERMEABILITY AND GROUND-WATER QUALITY DATA

436-784 O - 84 - 10 : QL 3

BORING LOG AND TEST DATA KEY



UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			LETTER SYMBOL	DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS, AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, MUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS INDICATE BORDERLINE SOIL CLASSIFICATION

Figure D-1.--Results of packer permeability tests on borehole 83-3 (Source: GeoEngineers, Inc., 1983).

BORING NO. 83-3

SURFACE ELEVATION APPROXIMATELY 805 FEET

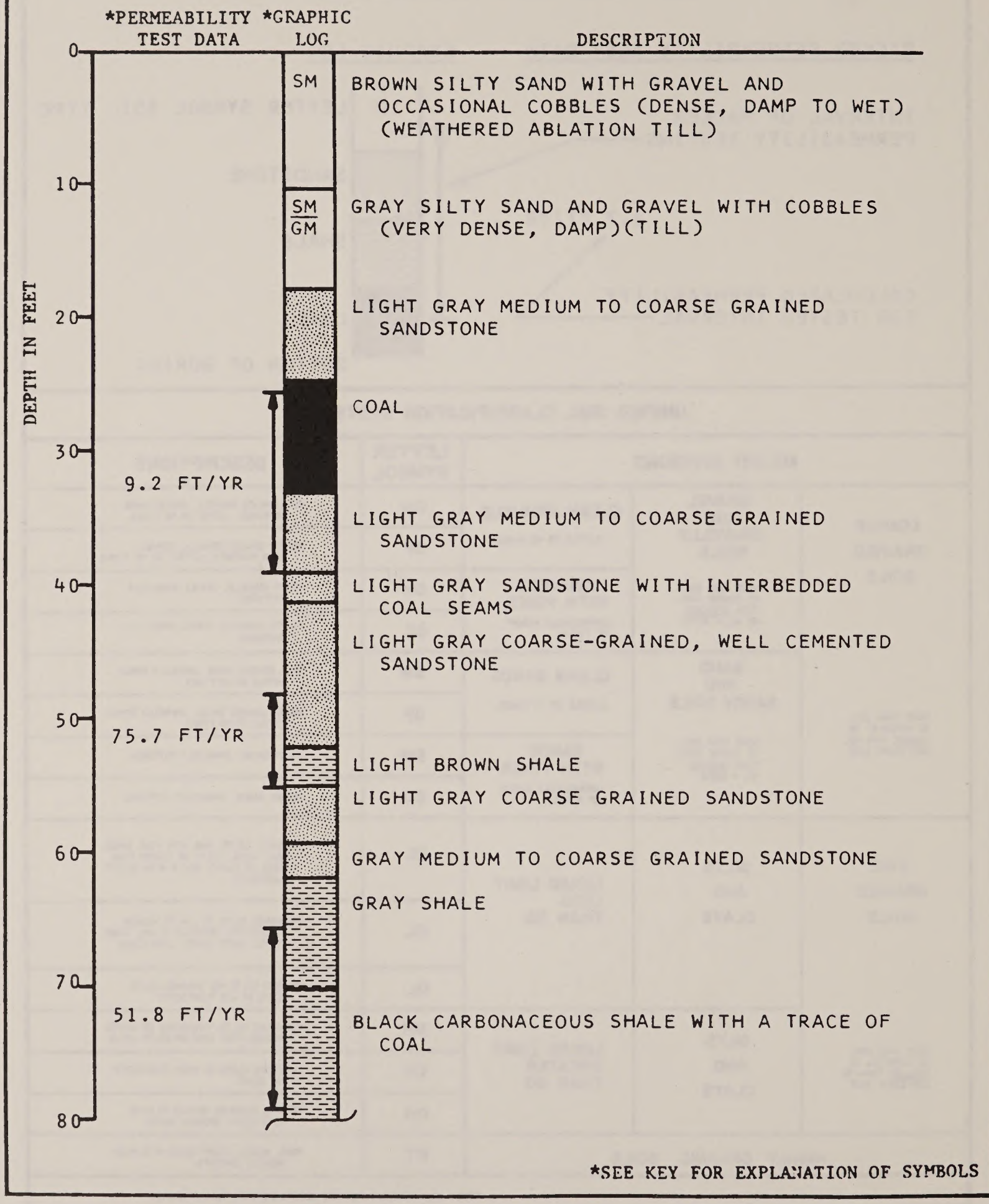


Figure D-1.--Results of packer permeability tests on borehole 83-3--Continued (Source: GeoEngineers, Inc., 1983).

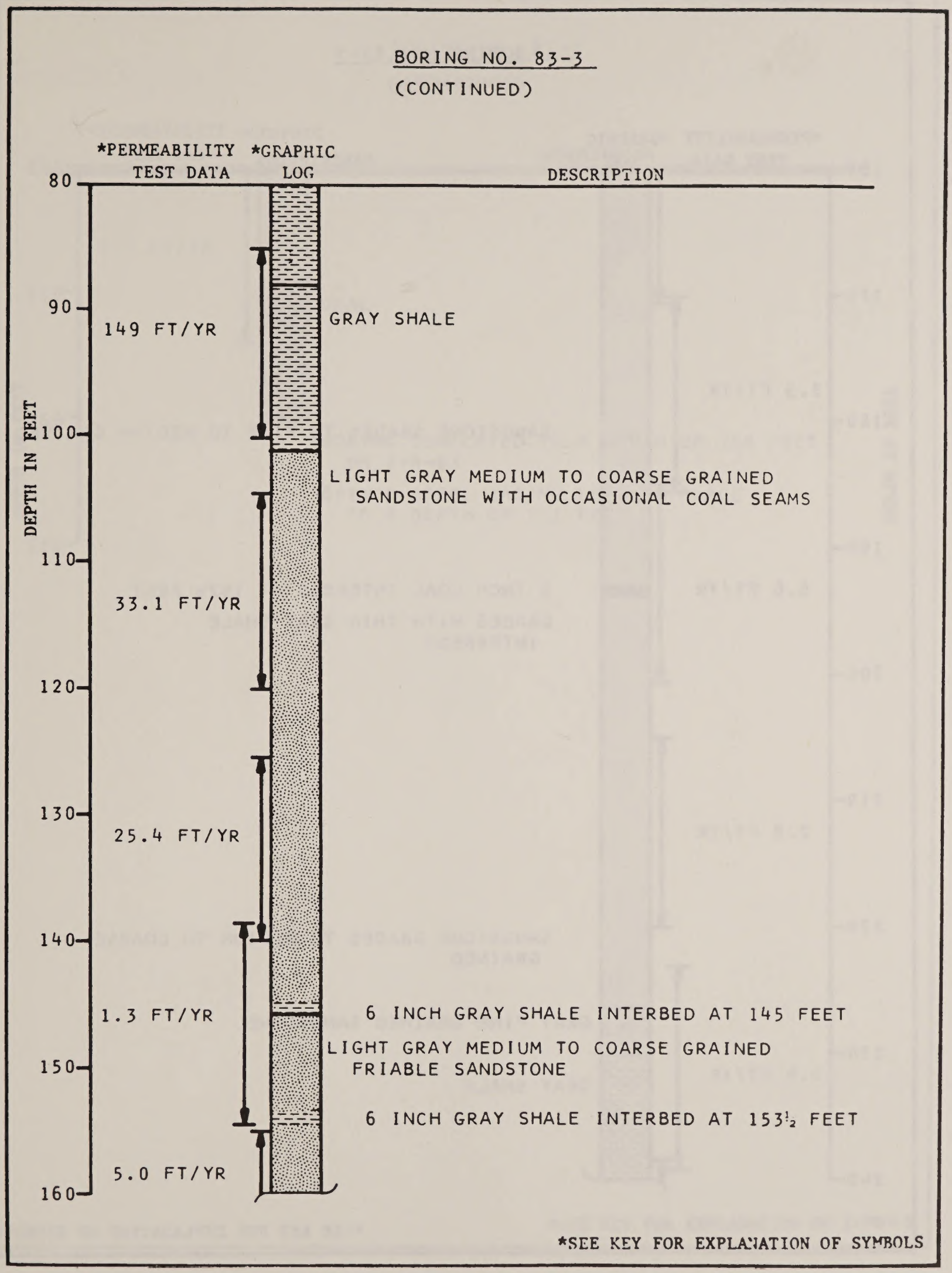


Figure D-1.--Results of packer permeability tests on borehole 83-3--Continued (Source: GeoEngineers, Inc., 1983).

BORING NO. 83-3
(CONTINUED)

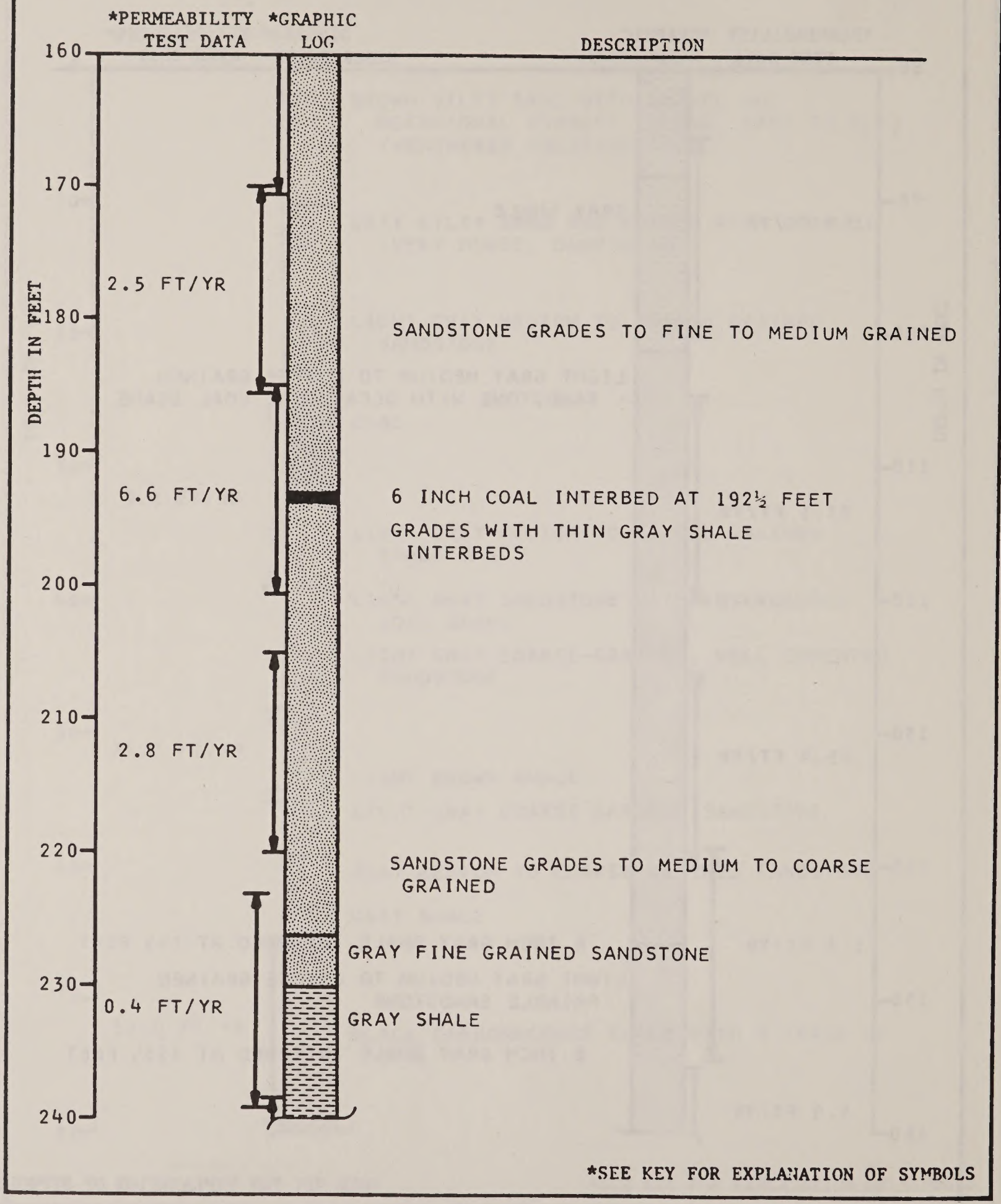


Figure D-1.--Results of packer permeability tests on borehole 83-3--Continued
(Source: GeoEngineers, Inc., 1983).

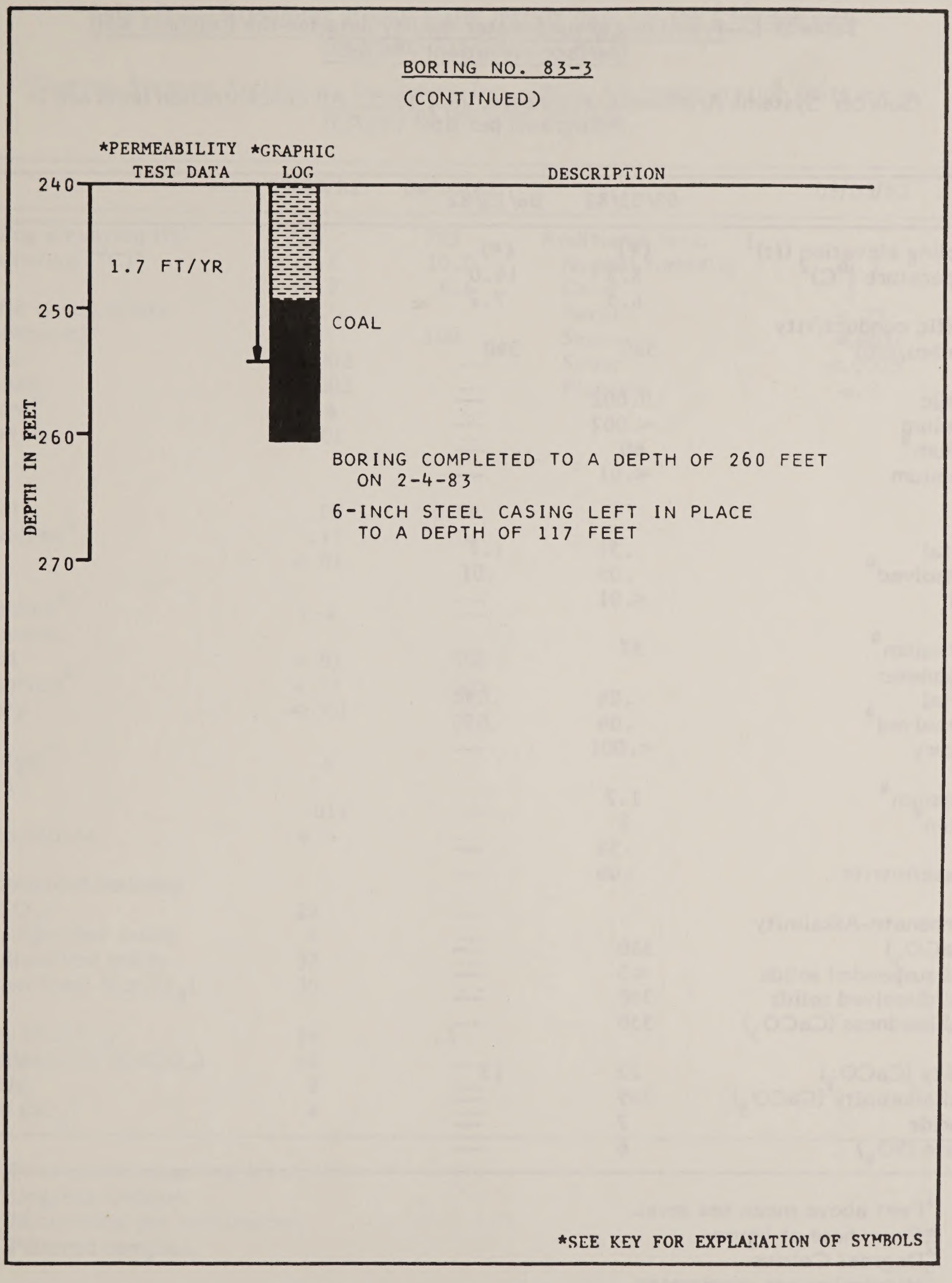


Figure D-1.--Results of packer permeability tests on borehole 83-3--Continued (Source: GeoEngineers, Inc., 1983).

Table D-1.--Premining ground-water quality data for the Reichert well (surface elevation: 796 feet)

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	06/15/82
Sampling elevation (ft)[1]	(*)	(*)
Temperature (°C)[2]	8.3	14.0
pH	6.5	7.2
Specific conductivity (µmhos/cm)[3]	580	340
Arsenic	<0.002	---
Cadmium	<.002	---
Calcium[4]	60	---
Chromium	<.01	---
Iron:		
Total	.51	1.7
Dissolved[4]	.05	.01
Lead	<.01	---
Magnesium[4]	37	---
Manganese:		
Total	.04	.050
Dissolved[4]	.04	.050
Mercury	<.001	---
Potassium[4]	1.7	
Sodium[4]	8	
Zinc	.58	---
Nitrate/nitrite	.06	---
Bicarbonate-Alkalinity ($CaCO_3$)	380	---
Total suspended solids	<5	---
Total dissolved solids	350	---
Total hardness ($CaCO_3$)	350	---
Acidity ($CaCO_3$)	22	13
Total alkalinity ($CaCO_3$)	309	---
Chloride	2	---
Sulfate (SO_4)	6	---

[1]Feet above mean sea level.
*From hose at house.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table D-2.--Premining ground-water quality data for the Clemens well (surface elevation: 732 feet)

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	06/15/82		03/03/82
Sampling elevation (ft)[1]	728	725	Additional test:	
Temperature (°C)[2]	7.2	10.0	Nephel turbidity	0.5
pH	6.2	6.6	Color	5
Specific conductivity (µmhos/cm)[3]	75	100	Barium	<.25
Arsenic	<0.002	---	Selenium	<.003
Cadmium	<.002	---	Silver	<.0005
Calcium[4]	6.6	---	Fluoride	<.2
Chromium	<.01	---		
Iron:				
Total	.08	0.04		
Dissolved[4]	.11	.01		
Lead	<.01	---		
Magnesium[4]	1.2	---		
Manganese:				
Total	<.01	.006		
Dissolved[4]	<.01	.005		
Mercury	<.001	---		
Potassium[4]	.6			
Sodium[4]	3			
Zinc	.019	---		
Nitrate/nitrite	4.0	---		
Bicarbonate-Alkalinity ($CaCO_3$)	22	---		
Total suspended solids	6	---		
Total dissolved solids	57	---		
Total hardness ($CaCO_3$)	30	---		
Acidity ($CaCO_3$)	14	13		
Total alkalinity ($CaCO_3$)	18	---		
Chloride	2	---		
Sulfate (SO_4)	4	---		

[1]Feet above mean sea level.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

Table D-3.--Premining ground-water quality data for borehole 81-2 (surface elevation: 806 feet)

(Source: Systems Architects, Engineers, Inc., 1982. All concentration units are in milligrams per liter (mg/L))

	03/03/82	06/15/82	03/03/82	06/15/82
Sampling elevation (ft)[1]	803	803	603	603
Temperature (°C)[2]	7.2	15.0	8.3	11.0
pH	8.8	8.9	8.6	8.9
Specific conductivity (µmhos/cm)[3]	545	450	673	430
Arsenic	0.003	---	0.064	---
Cadmium	<.002	---	.002	---
Calcium[4]	6.5	---	3.2	---
Chromium	<.01	---	.02	---
Iron:				
Total	.26	1.8	33	19
Dissolved[4]	.03	.02	1.1	.55
Lead	<.01	---	.022	---
Magnesium[4]	3.0	---	1.7	---
Manganese:				
Total	<.01	.030	.52	.24
Dissolved[4]	<.01	.011	.03	.005
Mercury	<.001	---	.004	---
Potassium[4]	2.5	---	6.7	---
Sodium[4]	130	---	160	---
Zinc	---	---	---	---
Nitrate/nitrite	<.05	---	<.05	---
Bicarbonate-Alkalinity ($CaCO_3$)	330	---	390	---
Total suspended solids	20	---	2,200	---
Total dissolved solids	320	---	630	---
Total hardness ($CaCO_3$)	25	---	28	---
Acidity ($CaCO_3$)	0	---	0	---
Total alkalinity ($CaCO_3$)	309	405	396	400
Chloride	3	---	8	---
Sulfate (SO_4)	<1	---	<1	---

[1]Cubic feet per second.
[2]Degrees Celsius.
[3]Micromhos per centimeter.
[4]Filtered samples.

APPENDIX E

CORRESPONDENCE CONCERNING THREATENED AND ENDANGERED SPECIES OF WILDLIFE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Endangered Species
2625 Parkmont Lane SW, B-2
Olympia, Washington 98502

January 18, 1984

MEMORANDUM

TO: Robert Schueneman, Chief
Technical Support Branch, OSM
Denver, Colorado 80202

FROM: Jim Bottorff, Project Leader
Endangered Species Office, FWS
Olympia, Washington 98502

SUBJECT: Section 7 Species List Request

Refer to: 1-3-84-SP-134

This is in response to your memorandum, dated December 15, 1983 and received December 20, 1983, for information on listed and proposed endangered and threatened species which may be present within the area of the proposed John Henry Surface Coal Mine No. 1, King County, Washington. Your request and this response are made pursuant to Section 7(c) of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq.

To the best of our present knowledge there are no listed or proposed species occurring within the area of the subject project. Should a species become officially listed or proposed before completion of your project, you will be required to reevaluate your agency's responsibilities under the Act. We appreciate your concern for endangered species and look forward to continued cooperation with your agency.

Attachment

cc: RO (AFA-SE)
ES, Olympia
WDG (Nongame)
WNHP

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR WITHIN THE AREA OF THE PROPOSED JOHN HENRY NO. 1 MINE, T21N, R6E, S11 & 12, KING COUNTY, WASHINGTON

1-3-84-SP-134

LISTED:

None

PROPOSED:

None

CANDIDATE:

None

Attachment A

U.S. GOVERNMENT PRINTING OFFICE : 1984 O - 436-784 : QL 3

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

Form 1279–3
(June 1984)

BORROWE

TD 195 .C58 J63 1984

Proposed John Henry N
mine, King County

DATE LOANED	BORROWER

USDI – BLM